COMMERCIAL FERTILIZER

CONSOLIDATED WITH THE FERTILIZER GREEN BOOK

Are you using the right Solution?

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Nitrogen Division produces NITRANA* Solutions 2-A, 3, 4 and 6, and URANA* Solution, adapted to various manufacturing conditions prevalent in the industry. One or more of these Solutions can be depended on to meet your plant's specific requirements.

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*Allied Chemical & Dye Corporation trade-mark

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For over 85 Years—
A Service to Industry

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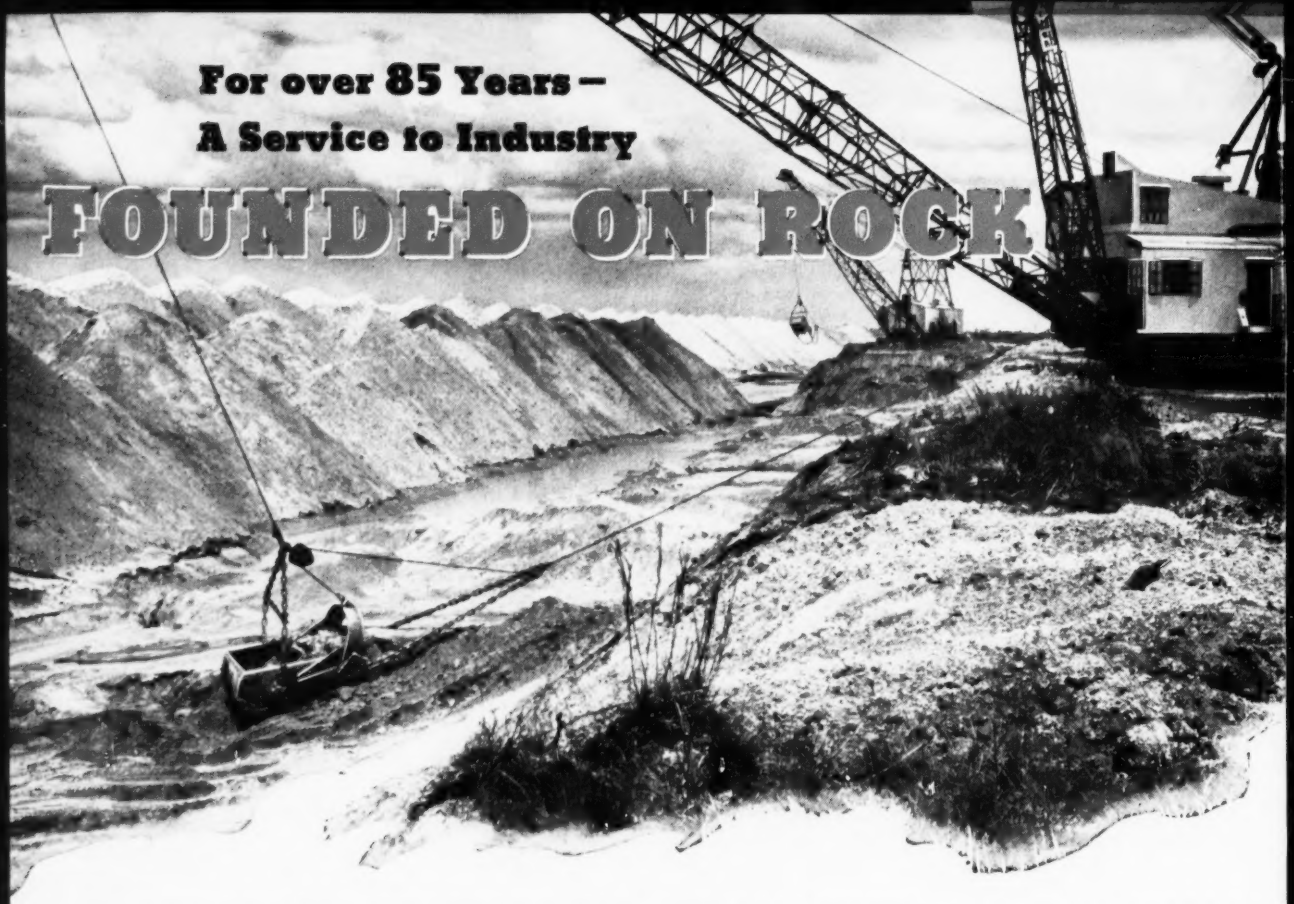

Mining pebble phosphate rock at A. A. C. Co. mines, Pierce, Florida.

Florida pebble phosphate rock as it comes from our mines—source of Elemental Phosphorus and other AA QUALITY products.

Phosphate rock from our own mines is the basis of a wide range of AA QUALITY products . . . a service to industry founded on rock. Ample rock reserves and our own production of Elemental Phosphorus 99.9% pure assure a dependable source of supply. Rigid control of all stages of production, from mines to finished product, means utmost purity and uniformity. Highest quality, security of supply, prompt service—good reasons for buying and specifying AA QUALITY products. Glance through the product list, below—write for full information.

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50% Pure Food Grade

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PHOSPHATE ROCK AND FERTILIZERS
All grades Florida Pebble Phosphate Rock
Superphosphate • Complete Fertilizers

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KEYSTONE® Gelatin: Edible, Photographic
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KEYSTONE Ammonium Carbonate
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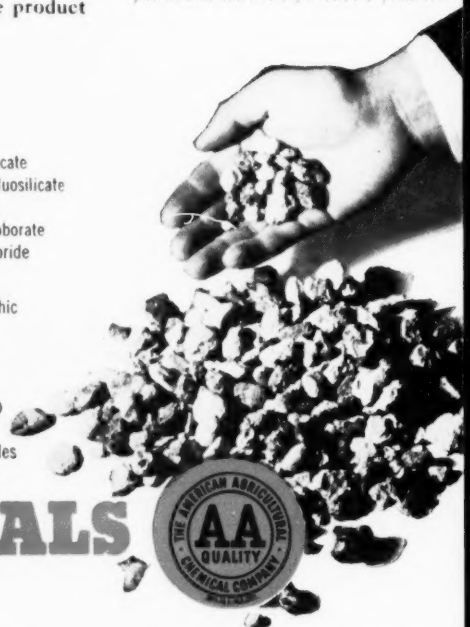

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Write Today for data sheet, samples or prices. Your inquiry, addressed to our Chemical Division, will receive prompt, careful attention.

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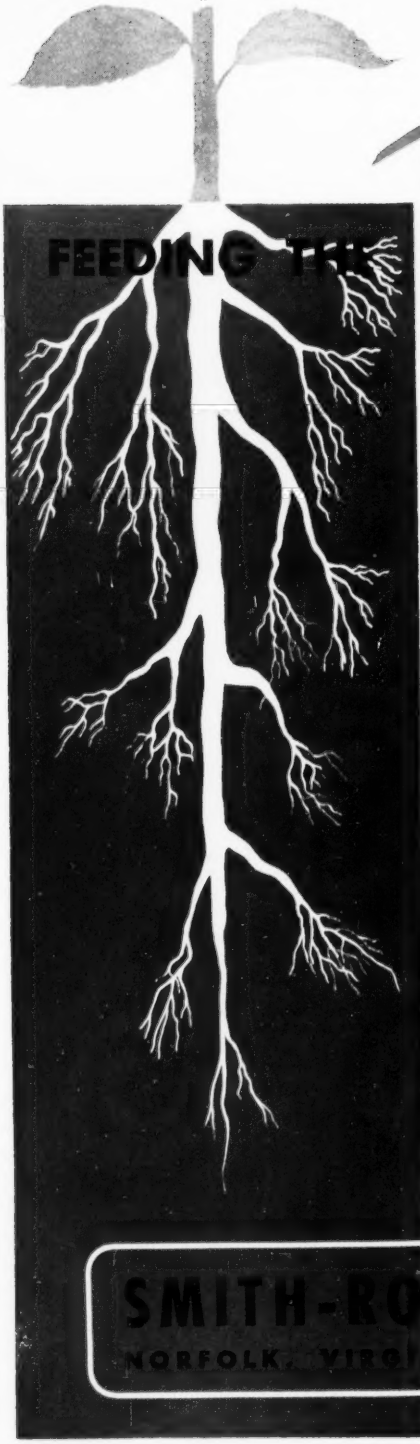

FEEDING THE Taproot OF SUCCESS...

Just as *quality* in the fertilizers you manufacture assures growth for the farmers' crops, just as surely does that reputation for *quality* assure growth for the manufacturers' business. For the very taproot of success in any business is the insistence upon quality in the goods produced.

There is no higher quality source of nitrogen for your Fertilizers than SMIROW TANKAGE. It is 100% natural organic. It is 90% water insoluble and 90% available. SMIROW TANKAGE is always in perfect mechanical condition . . . another mark of quality. It is uniform both in color and in texture.

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To help make your sales grow,
write for samples and prices.

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MAKES PLANTS GROW

SMITH-ROWLAND COMPANY
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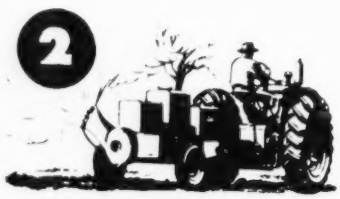

DILUENT FOR INSECTICIDES—With Aquafil you get high concentration which means savings.

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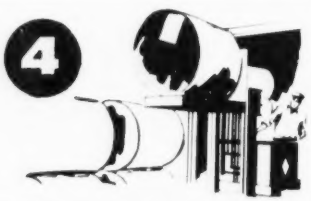

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COMMERCIAL FERTILIZER

ESTABLISHED 1910

May, 1953

Vol. 86 No. 5

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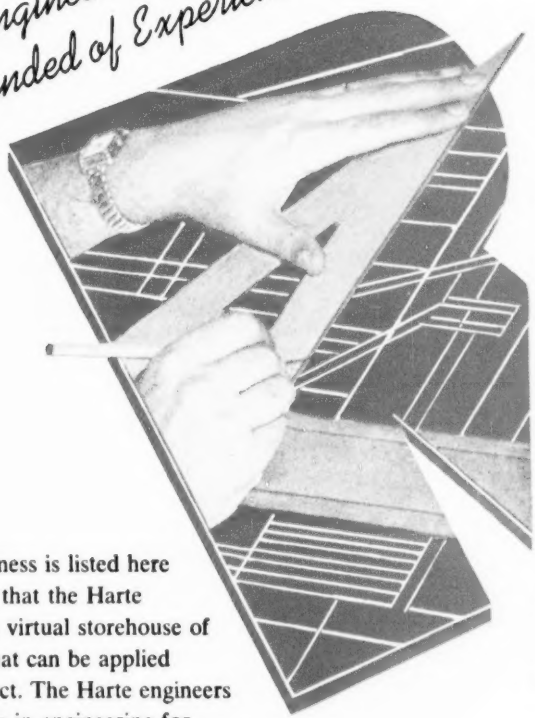

- SINGLE SUPERPHOSPHATE PLANTS
- TRIPLE SUPERPHOSPHATE
- AMMONIUM SULPHATE PLANTS
- NITRIC ACID
- STORAGE BUILDINGS
- NITRIC ACID ACIDULATION
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- PHOSPHORIC ACID
- GRANULATION PLANTS
- FERTILIZER MIXING PLANTS

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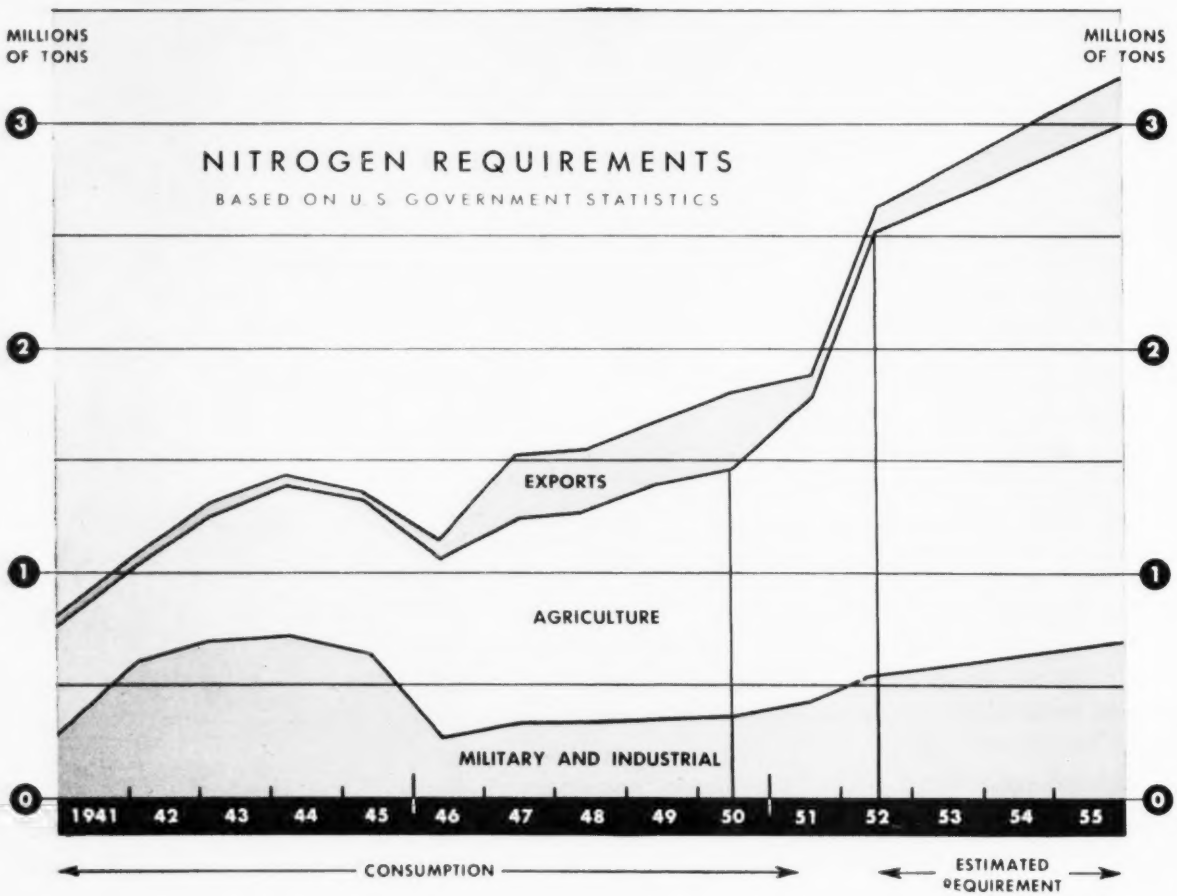
The experience we have gained from more than 900 heavy chemical installations throughout the world is assurance of successful completion and efficient operation of your plant.



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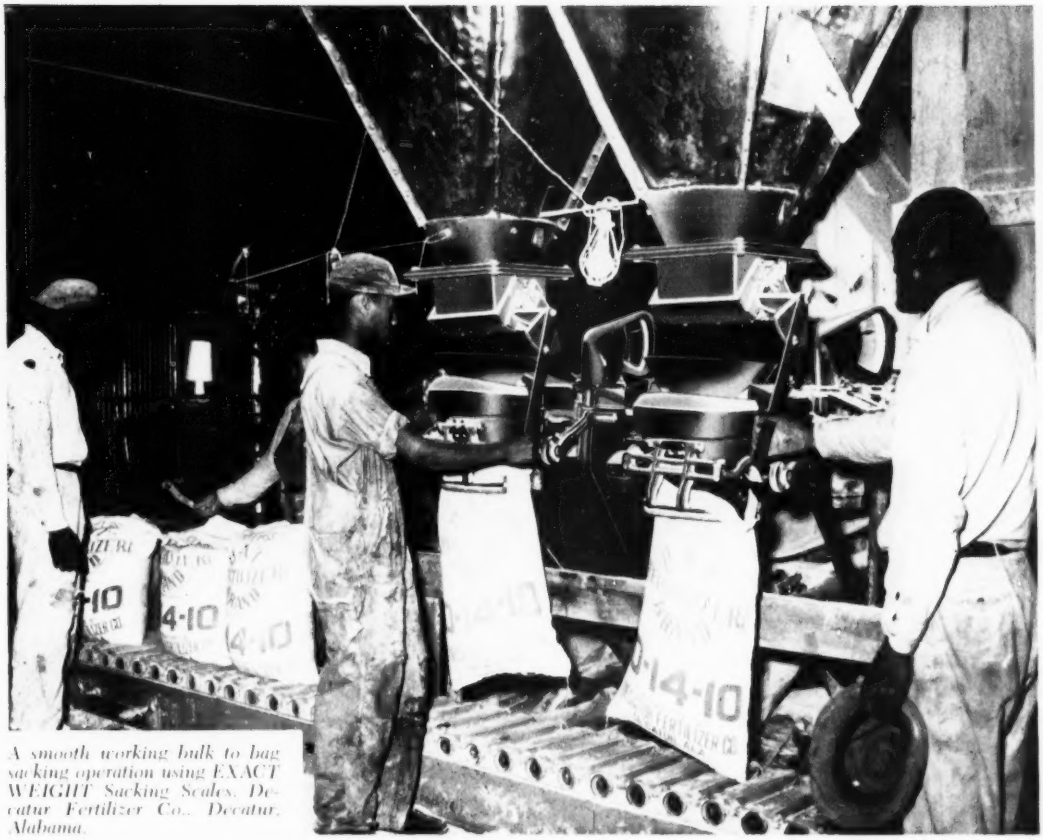

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THERE IS NO SUBSTITUTE FOR EXACT WEIGHT

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Declining profit margins are the result of several things but from a production standpoint very substantial progress in reduction of overhead can and is being made now. Two major conditions should be attacked for the solution of this problem. They are (1) eliminating overweight bags thereby saving production costs from bulk through packaging. (2) preventing underweight bags which bring on confiscated or returned products, an expense most adverse to favorable profit margins. The answer is better cost control with the right weighing equipment in the right place. This defeats your enemy "Packaging Leak". Better and better cost control is being accomplished every day with all types of EXACT WEIGHT Scales, today's leading checkweighing units. Why don't you write for details for your chemical operations.

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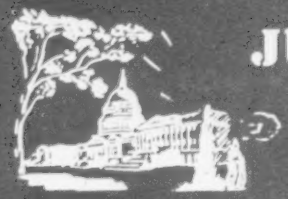


JUST AROUND THE CORNER

By Vernon Mount

KOREA IS ONLY 10% of the military spending of the US. That is a statistic we all should heed well if we are tempted to bite our nails about business conditions if "peace breaks out". It gives you a better idea of how little the expense of defense can actually be cut back--unless we go haywire again, as we did after 1945, lulled into a feeling of false security.

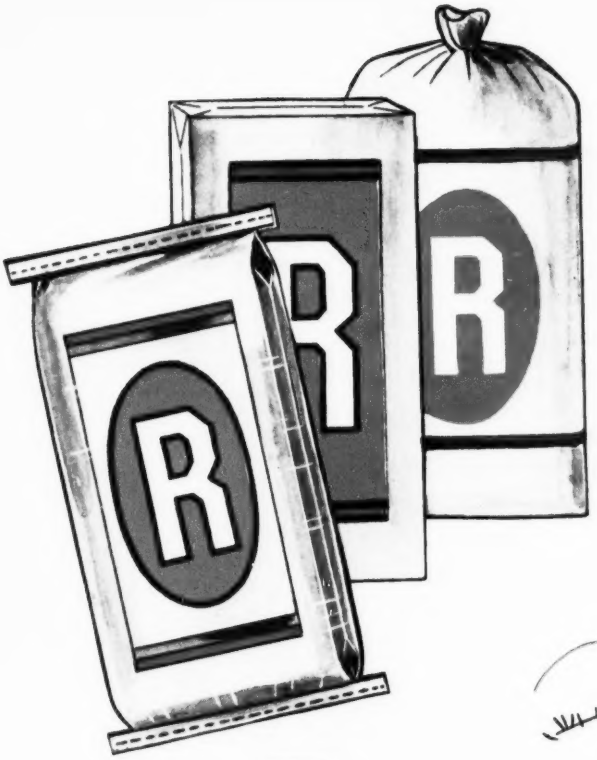
DEFENSE IS PERMANENT as an industry. From a social standpoint it is something to which we must be resigned. From an economic viewpoint, it is something which will continue to absorb labor and materials--probably for all our lives.

THE IKE PEACE OFFENSIVE is largely a means of putting Russia on the spot, showing up the Soviet as the source of world unrest, pinning on them the whole onus of warmongering. It is not really expected to produce disarmament. It is not expected to bring peace. It is not expected that the Leopard will change his spots.

BUT IT MIGHT HAPPEN--and the billions that now go to war could be diverted, as President Eisenhower has suggested, to the rebuilding of nations desolated and devastated by the wars of the past generation. But, until something tangible appears to assure world peace--expect a war economy to persist, and gear your business planning accordingly. Just now we need only fear fear.

Yours faithfully,

Vernon Mount



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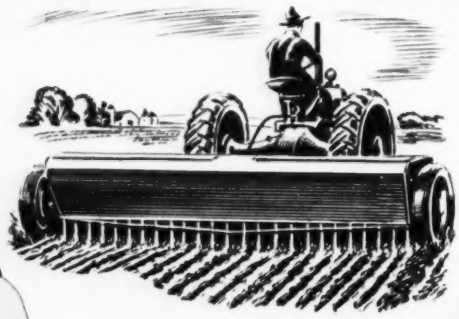

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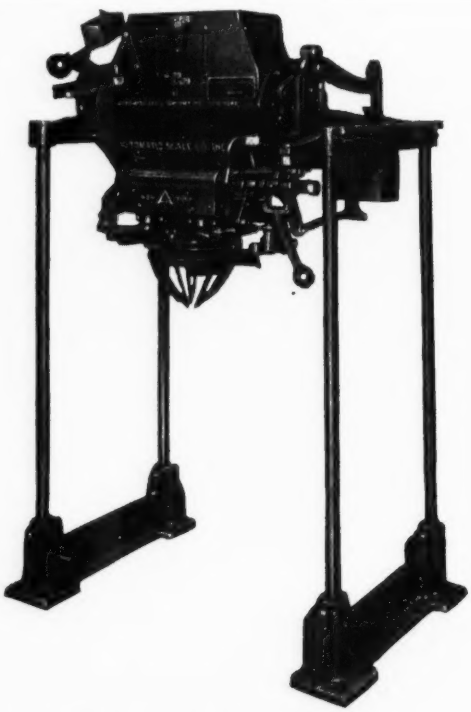

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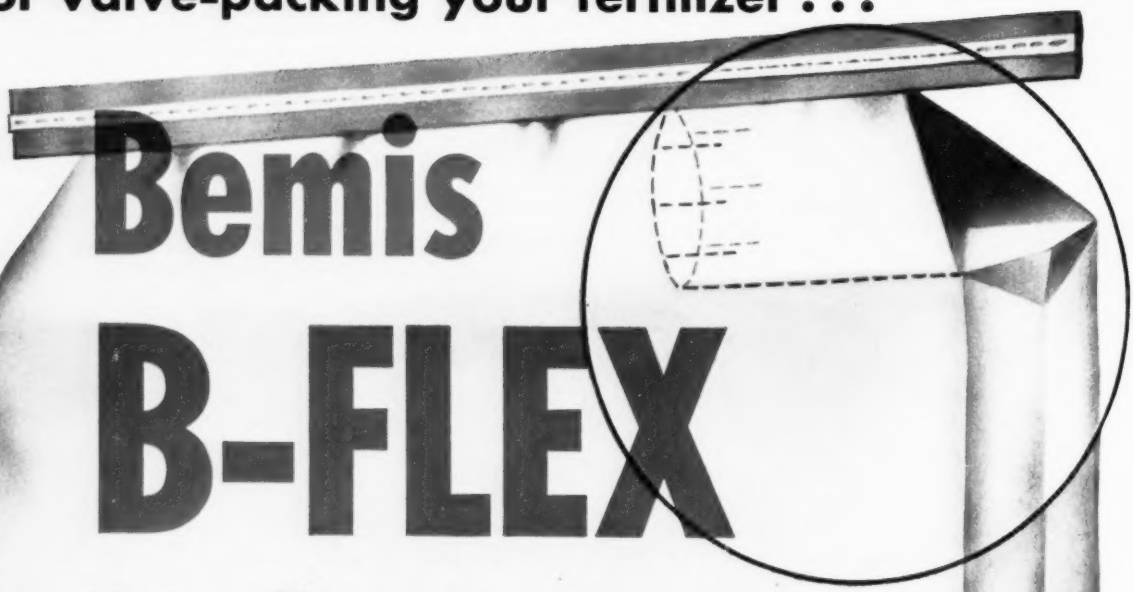

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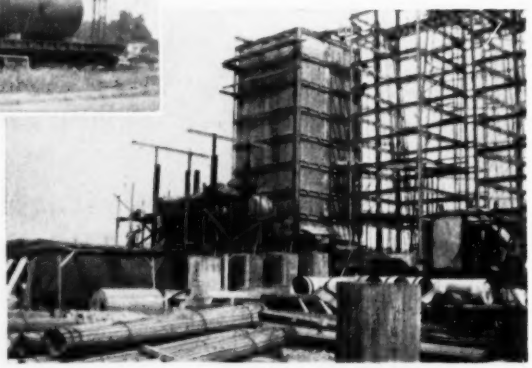

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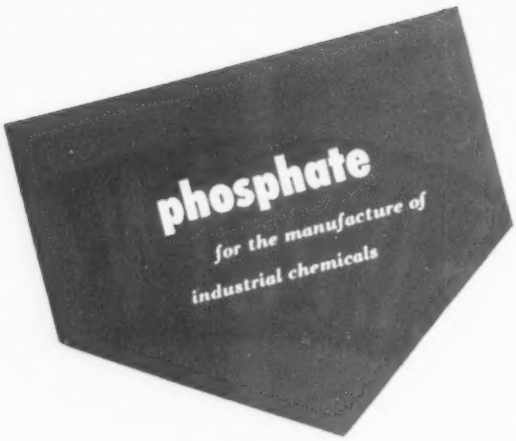

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WHAT'S IN IT FOR YOU?

From V-C News

The best safety record V-C folks ever had is in the making! This is the report we got from Safety Inspector Frank Kruck who keeps an impressive record of facts and figures on what's going on safety-wise in our V-C plants.

Statistics on man-hours lost per month through accidents are important, but you know, after all, it's the suffering, inconvenience and the temporary or sometimes even permanent loss of earning power resulting from an injury that has real meaning.

And so, instead of throwing our chest out this month and saying, boys, just take a look at that drop in our "Frequency Rate," we're asking "What's in it for you?" and with no less pride.

Insurance is a fine thing to have, but it cost a lot of money and not one of us doesn't hope we'll never cash in on it. Ever stop to think how much better off we are financially when we prevent accidents because insurance doesn't pay as much as we can earn when we're on the job? And not only do we get hurt, but our wives and children get hurt because they are deprived of the necessities which our income provides.

Of course, it goes without saying that we can make a better living if we have all our fingers and both legs and both arms—if we are not maimed in any way. One case of carelessness can take away any or all of these.

Active, alert safety committees throughout our organization are doing a bang-up job in helping to make our plants safe places in which to work. For a look at the really fine job they're doing, just read this record.

(Continued on page 70)

SEE SAFETY PAGE 64

It Seems to Me

by BRUCE MORAN

I don't know when I have been so disturbed by words as by the three words "bread corn acre" in a story on regulations governing the acceptance by farmers of TVA ammonium nitrate. All acres, except the one bread corn acre, must be planted thus and so. But the bread corn acre is reserved for the farmer to handle in his own way.

Those words drive home the responsibility we have toward the simple farmers of America. The bread corn. The roof. The clothes. These are fundamentals, and we help make them possible. We could so easily help them to better these fundamentals, and we do try.

But the very reservation of the bread corn acre is a proof that the farmer does not entirely trust us and our newfangled ideas. He will go along on the rest of his acres. He will try our experiments. But when it comes to that one final acre on which he depends to make corn bread, with which to sop up his gravy, your old-line farmer follows the ways of his forefathers. He plays safe.

The bread-corn acre is a symbol of the reasons it has taken so long to bring analysis even as high as it stands now. It is the reason so many farmers are "not farming now as well as they know how."

There is a subject for next month's conventions: for the approaching meetings of the various state level educational societies . . . how can we speed up acceptance of what the agronomist knows, so the bread corn acre, too, can flourish as we know how to make it do.

INDUSTRY CALENDAR

Date	Organization	Place	City	State
May 7-8	CFA-Soil	Marysville	Marysville	Cal.
June 11-14	APFC	Homestead	Hot Springs	Va.
June 15-17	NFA	Greenbrier	White Sulphur	W. Va.
June 30-July 2	Pacific N. W.	Harrison	Hot Springs	Brit. Col.
July	Canadian	Algonquin	St. Andrews	N. B.
Sept. 9-11	NAC	Essex & Sussex	Spring Lake	N. J.
Nov. 4-5	Pacific N. W.	College	Pullman	Wash.
Nov. 9-10	CFA	Theatre	Carmel	Cal.

Portions of a talk by John H. Davis, Director of Commodity Marketing and Adjustment, and President of the Commodity Credit Corporation, U. S. Department of Agriculture, at the Annual Convention of the Texas Cotton Association, Houston, Texas.

This is also a very good time to review some broad questions of agricultural policy. There is a new administration in Washington, and you naturally want to know something of our thinking—something of our approach to the basic problems with which we are all concerned.

Immediately before us are questions regarding 1953 crops. Important among these is the size of the 1953 cotton crop. I will talk more about this later, and point out what we must do voluntarily this year if we are to avoid acreage and marketing controls next year. But, first, I want to discuss some more general issues.

Let me state that your new public servants in Washington want a prosperous agriculture. We know that a prosperous agriculture is in the public interest as well as in the farmer's interest. By a prosperous agriculture we do not mean 90 percent of parity, but full parity or higher. Indeed, we want the farmer to have an economic status fully equal to that of other economic groups. Certainly for the most part we should seek to do this through a sound marketing program, using support programs as a buttress to our economy during periods of weak prices.

Also, I want to emphasize that we are going to support cotton at full 90 percent of parity as we are authorized to do under existing law.

Next, let me say that we are not ready today to announce just what kind of farm program we will advocate following 1954 when the present mandatory support policy for basic crops expires. We are reluctant today to announce what we will advocate following 1954 because first we want to try to work out better farm programs. Certainly, this reluctance is in no way evidence of a desire on our part to reduce farm income. Indeed, the reverse is true. In working out new programs, our goal will be full equality on income with other economic groups.

We want to examine all of the suggestions that come along. With respect to improving our farm economy, we want to explore the expanded use of marketing agreements, the practicability of a two price system, the feasibility of price insurance, the possibility of using guranteed loans and many other ideas. Also, we want to develop a better marketing and distribution system which will put food into hungry stomachs rather than into warehouses.

In doing this we intend to start from where we are and move to something better. In other words, we shall not scrap the present programs until we have something better. We expect to build on the experience of the past in order to make the future more secure and more prosperous than the past.

Nor do we think that a few of us in Washington should work out a farm program by ourselves. Instead, we shall call in advisory groups representing the producers and all other important segments of the farm production and distributive industry. In fact we are already doing this in our effort to improve the 1953 support programs. Since January 20,

we have met with advisory groups regarding 9 different commodities.

Let us not forget that we are living in a progressive and changing age, and that agriculture as well as industry has a stake in progress. The average American worker has increased his output of product by more than 2 percent per year during the past 50 years. This has not been done by harder work on his part, but by the use of improved methods and equipment. To put it another way, the average American worker today is two to three times as efficient as was his father or grandfather 50 years ago. It is this increased efficiency that has made possible our rising standard of living. Progress and prosperity are teammates.

Generally speaking, the American farmer has about kept pace with his city cousin when it comes to increased efficiency. The result is that he has the highest living standard of all farmers in the world today. We want to help him in that position. The American farmer must continue to increase his efficiency if he is to continue to improve his standard of living.

Therefore, it is imperative that year by year we reexamine our farm policies and farm programs in order to be sure that they are the best we can make them. In brief, farm programs like progress itself must be a process of evolution.

A recent caller in my office stated to me that he believed that farm programs tend to block progress and therefore were a bad thing. This could be true if we fail to improve our programs as we go along. But certainly it need not be true. Farm programs which lead to reasonable stability should promote rather than defeat progress.

Of course, the great source of progress is research plus an educational program to get new ideas into practice. This administration will emphasize both research and education. We shall emphasize particularly the importance of our land grant college system. Also contributing to progress are our conservation programs, farm electricity and telephones, and adequate credit. With respect to all of these, we expect to help farmers to start from where they are today and build towards a better and more prosperous farm economy.

We hear much talk about flexible support versus rigid support prices. While this is an important issue, it is not the most important. The real question should be: Does any proposed policy lead towards greater farm efficiency, progress and prosperity, and does it contribute towards greater human happiness? Certainly farm programs must be flexible in many respects if they are to be consistent with progress.

I am sure I need not tell you that the new administration has inherited some problems. Farm prices have been falling for about two years. Surpluses are piling up. Today the Commodity Credit Corporation has about 1 billion 100 million dollars invested in inventories of farm products. In addition, price-support program loans on stored commodities amount to around 1-3/4 billion dollars—or a total approaching 3 billion dollars invested in loans and inventories together.

As of March 31, when the old dairy support program which we inherited ends, we will have bought under current support operations about 120 million pounds of butter, 65 million pounds of cheese, and 190 million pounds of dried milk.

We now have in inventory about 461 million pounds of cottonseed oil, 104 thousand tons of cottonseed meal and cake, and 421 million pounds (more than 700 thousand bales) of cotton linters.

The CCC investment in inventory stocks will rise still higher this spring on the maturity of non-recourse loans. In brief, one of our great problems is to find a way to manage the CCC stocks of farm commodities without spoilage, without waste to the tax payer, and without depressing commodity markets. I need not tell you that this is a most difficult problem. Again, we are seeking the advice and help of growers, processors and distributors. Also, we are seeking ideas as to new approaches to the farm program which do not involve as much ownership of commodity stocks by CCC. We believe that our best approach is to help farmers to help themselves.

Another very knotty problem is that of farm imports and exports. In the case of expert commodities such as cotton and wheat, our foreign markets are contracting. Present indications are that cotton exports during the present marketing season (1952-53) will be not more than 4 million bales, as compared with exports of 5-1/2 million bales last year. Wheat exports likewise have shrunk. Exports during the 1951-52 marketing year were approximately

475 million bushels; estimates for the present marketing year (1952-53) are about 325 million bushels.

In the case of many commodities which are not on an export basis, we are being besieged with requests for action to restrict imports. The argument is that excessive imports are being attracted by our support prices. One of the big issues before us is: How do we reconcile our reciprocal trade policy with our price support policy? Stated another way: How do we get cotton and wheat prices on an export basis, and how do we keep from supporting wool and tung oil prices for the entire world? The problem of foreign trade is further complicated today by the rapid increase in many countries of the practice of state trading, licensing and currency control.

It is obvious that I have not attempted to outline a new program for agriculture. Rather, I have tried to explain our procedure for working out a better farm program, starting with what we have now. It will take teamwork among producers, the trade and government.

Now for a brief review of the cotton situation, and the problems ahead as we see them. Cotton farmers have a decision to make—in the light of the general situation—which will largely determine the stability of the cotton industry in the years immediately ahead.

You will remember the tight situation which developed for cotton in 1950. As a result of the short crop that year, and the increased demand following the outbreak of trouble in Korea, it was even necessary to put export allocations into effect. As a result, big crops were needed to correct the situation.

Farmers produced relatively big crops in both 1951 and 1952. All current needs were met, and reserves have been built back to adequate levels. The carryover of old stocks this coming August 1 is expected to total about 4.3 million bales.

Very simply, this means that we have caught up on cotton production. We do not need another big crop year. In fact, another crop even approaching the levels of the last two years would get the industry into serious surplus troubles. Production in 1953 even at the 13 million bale level originally suggested would probably bring supplies dangerously close to the marketing level provided in the current legislation.

This is how the picture looks on the basis of the best available estimates at this time.

Total cotton supplies for the present (1952-53) marketing season are about 17.8 million bales. This total is made up of a carryover last August of 2.8 million bales, a 1952 crop of 14.9 million (December estimate), and imports of around 100 thousand bales.

Total disappearance of cotton during the present year is estimated at about 13.5 million bales—around 9.5 million consumed by domestic mills and about 4 million bales of exports.

Such disappearance would leave us with the 4.3 million bale estimate for the carryover next August, before the 1953 crop comes in.

This brings us to the question of how much cotton should be produced this year. As one measuring stick, we can check the "quota level" provided in the controlling legislation. This legislation calls for the proclamation of marketing quotas for the next cotton crop when the total supply exceeds the "normal supply." The "normal supply" is to be determined by adding 30 percent to the expected export and domestic requirements.

While there are too many variable factors in the situation to make possible definite estimates this far in advance, there is some basis for believing that total disappearance during the 1953-54 marketing season will not be very different from that for the current year—or possibly from 13 to 13.5 million bales. Adding 30 percent to that would give us a figure of around 17 to 17.5 million bales for the "normal supply"—the basis for determining whether or not marketing quotas would be required for the 1954 crop.

With the estimated August 1953 carry-over at 4.3 million bales, it is obvious that 1953 production of 13 million bales would bring us very close to the "quota level," if not actually above it.

That is why secretary of Agriculture Ezra Taft Benson recently lowered the sights on cotton production and asked farmers to produce not more than a 12 to 12.5 million bale crop in 1953.

There are several reasons for the over-all cotton situation which has resulted in the sharp drop in the need for new cotton production. One, of course, is the simple fact that the big crops of the past two years have caught up with current demand and also built ample reserves. Again, there is a leveling off of domestic demand and a material drop in exports.

(Continued on page 60)

The toughest three-letter word in business

"But . . ."

The word a man uses when he starts by nodding yes and ends by saying no.

"But . . ."

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H. I. Graser, Director, Sutter County Agricultural Extension Service.

H. P. Everette, Director, Butte County Agricultural Extension Service.

Dr. W. E. Martin, Program Chairman.

PROGRAM

9:00 A.M. Crop System and Soils of the Sutter-Yuba Area—Mr. Merle D. Collins, Yuba County Director of Extension.

9:25 A.M. Fertilizer Results with Fruit Trees in Butte County—Mr. Henry P. Everett, Butte County Director of Extension.

9:50 A.M. Results of Fertilizer Tests with Rice—Mr. John Lindt, Farm Advisor, Sutter County

10:15 A.M. Recess.

10:30 A.M. Results of Grain Fertilizer Tests— Mr. Walter Anderson, Farm Advisor, Yuba County.

10:55 A.M. Results of Fertilizer Tests with Alfalfa—Mr. Morton Morse, Farm Advisor, Butte County.

11:20 A.M. Range and Pasture Fertilization— Mr. Lemuel Osborne, Farm Advisor, Yuba County.

11:40 A.M. Recess for luncheon, at place of your choice.

* * * *

1:30-5:00 P.M. Field Trip to Observe Grain, Range and Pasture Fertilization Tests and Demonstrations in Yuba, Sutter and Placer Counties.

* * * *

7:00 P.M. Stag Dinner—Hotel Marysville.
($300 plus tax and tip)

8:00 P.M. Growth and Development of Sugar Beet Plants in Temperature Controlled Greenhouses— Dr. Albert Ulrich, Associate Plant Physiologist, Department of Plant Nutrition, University of California, Berkeley.

May 8
Sponsored by
Soil Improvement Committee
CALIFORNIA FERTILIZER ASSOCIATION
J. H. (Hank) Nelson, Program Chairman
Registration Fee—$1.00
PROGRAM

9:00 A.M. Objectives of The Soil Improvement Committee—California Fertilizer Association, Mr. M. E. McCollam, Committee Chairman.

9:15 A.M. The Role of Mineral Nutrients in Plant Growth—Dr. L. D. Davis, Professor of Pomology, Davis.

9:45 A.M. Soil Fertility Research at Riverside—Dr. D. G. Aldrich, Jr., Associate Chemist, Dept. of Soils and Plant Nutrition, University of California Citrus Experiment Station, Riverside.

10:15 A.M. Recess.

10:25 A.M. Example of Soil Fertility Activities of the Agricultural Extension Service—Dr. W. E. Martin, Extension Soils Specialist, Berkeley.

10:55 A.M. Fertilizers—A Tool in Conservation Farming—Mr. Leonard R. Wohletz, State Soil Chemist, Soil Conservation Service, Oakland.

11:00 A.M. Laws Regulating Salesmen—Mr. Allen B. Lemmon, Chief, Bureau of Chemistry, Sacramento.

11:25 A.M. Potash Production in California and the United States, (includes colored Motion Picture)—Mr. Rod Taft, American Potash & Chemical Corp., Los Angeles.

12:00 noon Recess for luncheon, at place of your choice.

* * * *

1:30 P.M. History and Manufacture of Anhydrous Ammonia and Ammonium Sulphate—Mr. F. Haven Leavitt, Agricultural Technologist, Shell Chemical Corp., San Francisco.

2:15 P.M. Nutrient Levels in San Diego County Lemon Groves—Mr. Forrest Fullmer, Field Agronomist, American Potash Institute, Newport Beach.

2:45 P.M. Recess.

3:00 P.M. Pot Tests as a Diagnostic Tool— Dr. W. E. Martin, Extension Soils Specialist, Berkeley.

3:35 P.M. Responsibilities of Fertilizer Salesmen—Mr. George P. Bloxham, Pacific Guano Co., Los Angeles.

PACIFIC NORTHWEST MEETS AT PULLMAN, WASHINGTON

June 29

Registration 3:00-7:00 P.M.—Union Building, Second Floor Lobby.

A pre-conference meeting about soil testing, tissue and foliar analysis and its interpretations, will be held on Monday June 29, beginning at 9 A.M. in Room 13, Wilson Hall.

June 30
Todd Auditorium

8:00-9:00 Registration.

Chairman: Horace B. Cheney, Chairman, Soils Dept., Oregon State College, Corvallis, Oregon.

9:00-9:30 WELCOME! C. C. French, President, W.S.C., Pullman, Wash.

GLAD TO BE HERE! E. B. Shipley, President, Pacific Northwest Plant Food Assoc., Swift and Co., North Portland, Ore.

Report of previous day's Technical Meeting and general philosophy. Where do we stand?

9:30-9:50 ON SOIL TESTING—Bob Whiting, Swift and Co., North Portland, Ore.

9:50-10:10 ON FOLIAR ANALYSIS—F. T. Tremblay,

Washington Co-operative, 201 Elliott Ave., West, Seattle 99, Wash.

10:10-10:30 VALUE AND LIMITATIONS OF THE METHODS OF DIAGNOSING PLANT NUTRIENT NEEDS.—George D. Scarseth, Director of Research American Farm Res. Assoc., 300 Shultz Bldg., Lafayette, Indiana.

10:30-10:40 Recess.

10:40-11:00 ECONOMIC ASPECTS OF FERTILIZER RECOMMENDATIONS—W. R. Allstetter, Vice Pres. National Fertilizer Assoc., 616 Investment Bldg., Washington 5, D. C.

11:00-11:20 SOIL FERTILITY AND MANAGEMENT PROBLEMS IN THE WHEAT PRODUCING AREA OF THE PACIFIC NORTHWEST—Glenn Horner, USDA, W.S.C. Pullman, Wash.

11:20-11:40 PRACTICAL APPLICATION OF SOIL ANALYSIS IN WHEAT PRODUCTION—L. E. Warner, Pendleton Grain Growers, Inc., Pendleton, Ore.

11:40-12:00 REPORT ON GRASSLAND FARMING. FIRST YEAR'S RESULTS OF THE FARM IMPROVEMENT PLAN. THE BENEDICT FARM—LaVerne Freiman, County Agent, Bellingham, Wash.

12:10-1:30 Luncheon. Union Building. George Wickstrom, American Potash, Inc., 519 Alder, Sumner, Wash. M. C.

WE STILL HAVE NEW FRONTIERS—John R. Taylor, American Plant Food Council, Inc., Barr Bldg., 910—17th St., N. W., Washington 6, D. C.

1:35-5:00 Tour of Field Experiments in Palouse area. (By busses from Union Bldg.)

General tour, Soil Erosion Farm, local stops in vicinity, then to University of Idaho. See Baker's Soil Management Plots. Go to an actual farmer's location near Genessee. Return via Uniontown to Pullman.

Reisenauer, Baker, Horner, and Leggett worked up plantings last fall in preparation for this. They tentatively plan to show:

Sulfur responses on legumes.

Levels of nitrogen fertilization and rotation effects on wheat.

Fertility effects and yields of beef on SCS—Agronomy—Animal Husbandry grazing experiments.

Soil sampling demonstration with sampler and brief discussion of soils in the area at a stop. H. W. Smith and R. A. McCreery.

6:30 Informal dinner. Union Building.

7:30 SOILS OF WASHINGTON. Illustrated Lecture—H. W. Smith, Agronomy Dept., W.S.C., Pullman, Wash.

July 1

Todd Auditorium

Chairman: Jim Kraus, Director of Experiment Stations, University of Ida., Moscow, Idaho.

8:30-8:55 ALKALI SOILS, THEIR NATURE AND RECLAMATION—C. D. Moodie, Agronomy Dept., W.S.C., Pullman, Wash.

8:55-9:15 HOW DOES NITROGEN FERTILIZER MOVE IN THE SOIL?—Robert Hausenbuiller, Irrigation Experiment Station, Prosser, Wash.

9:15-9:25 T.V.A. FERTILIZER PROGRAM—Eric Winters, T.V.A., Knoxville, Tenn.

9:25-9:50 SOIL CONDITIONERS—Walter H. Gardner, Agronomy Dept., W.S.C., Pullman, Wash., and Ray Pendleton, Soils Dept., O.S.C., Corvallis, Ore.

9:50-10:00 Recess.

10:00-10:20 SOME NUTRITIONAL DISORDERS OF APPLE TREES—Nels Benson, Tree Fruit Experiment Station, Wenatchee, Wash.

10:20-10:40 WHY STATISTICS? George Darroch, Agricultural Experiment Station, W.S.C., Pullman, Wash.

10:40-11:00 SOIL FERTILITY PROBLEMS IN TREE PRODUCTION IN BRITISH COLUMBIA—J. C. Wilcox, Dominion Exp. Sta., Summerland, B. C.

11:00-11:20 LIQUID FERTILIZERS: PROPERTIES AND POTENTIALITIES—Robert Luckhardt, Agriform Co., 248-20th St., Costa Mesa, Calif.

11:20-11:50 CHELATED COMPOUNDS, NEW TRICKS IN MINOR ELEMENT NUTRITION OF PLANTS—C. Emlen Scott, Plant Pathology Dept., Univ. of Calif., Berkeley 4, Calif.

11:50-12:10 IT'S THE WATER-SOLUBLE PHOSPHATE THAT DOES THE TRICK IN WESTERN WASHINGTON. Todd Tremblay, Washington Cooperative, 201 Elliott Ave., West, Seattle 99, Wash.

12:20 Luncheon—Dr. M. T. Buchanan, Director, Experiment Stations, W.S.C., Pullman, Wash. M.C.

RESEARCH PAYS! George D. Scarseth, Director of Research, American Farm Res. Assoc., 300 Schultz Bldg., Lafayette, Ind.

Chairman: Dr. J. C. Knott, Director, Institute of Agricultural Sciences, W.S.C., Pullman, Wash.

1:30-1:45 Introductory remarks by Chairman on WHAT'S AHEAD IN THE BASIN?

1:45-2:10 GEOLOGY OF THE COLUMBIA BASIN—R. E. Brown, Nucleonics Div., General Electric Co., Richland, Wash.

2:10-2:30 SOILS DISTRIBUTION IN THE COLUMBIA BASIN. W. A. Starr, Agronomy Dept., W.S.C., Pullman, Wash.

2:30-2:50 BUILDING AND OPERATING THE COLUMBIA BASIN PROJECT—P. R. Nalder, Bureau of Reclamation, Columbia Basin District, Ephrata, Wash.

2:50-3:00 Recess.

3:00-4:30 SOIL FERTILITY STUDIES IN THE COLUMBIA BASIN—Frank Viets, U.S.D.A., Irrigation Exp. Sta., Prosser, Wash. Moderator.

THE FUNCTION OF DEVELOPMENT FARMS IN THE COLUMBIA BASIN—John Toevs, Columbia Basin Project, Bur. of Reclamation, Ephrata, Wash. (20 Min.)

SUMMARY OF FERTILIZER RESULTS FROM RESEARCH—Emil Nelson, U.S.D.A., Irrigation Exp. Sta., Prosser, Wash. (20 Min.)

WATER MANAGEMENT IN RELATION TO COMMERCIAL FERTILIZER USE—John Robins, U.S.D.A., Irrigation Exp. Sta., Prosser, Wash. (20 Min.)

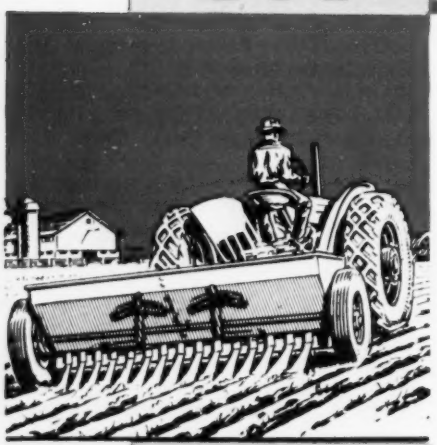
ZINC DEFICIENCY IN THE COLUMBIA BASIN—Frank Viets, U.S.D.A., Irrigation Exp. Sta., Prosser, Wash. (20 Min.)

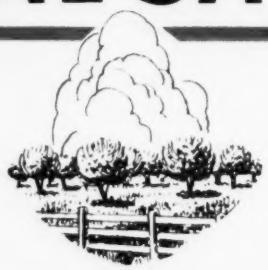
DISCUSSION. (10 min.)

4:30-4:50 THE BASIN IN 1975—A. H. Harrington,

TENNESSEE CORPORATION

MINERAL SALTS





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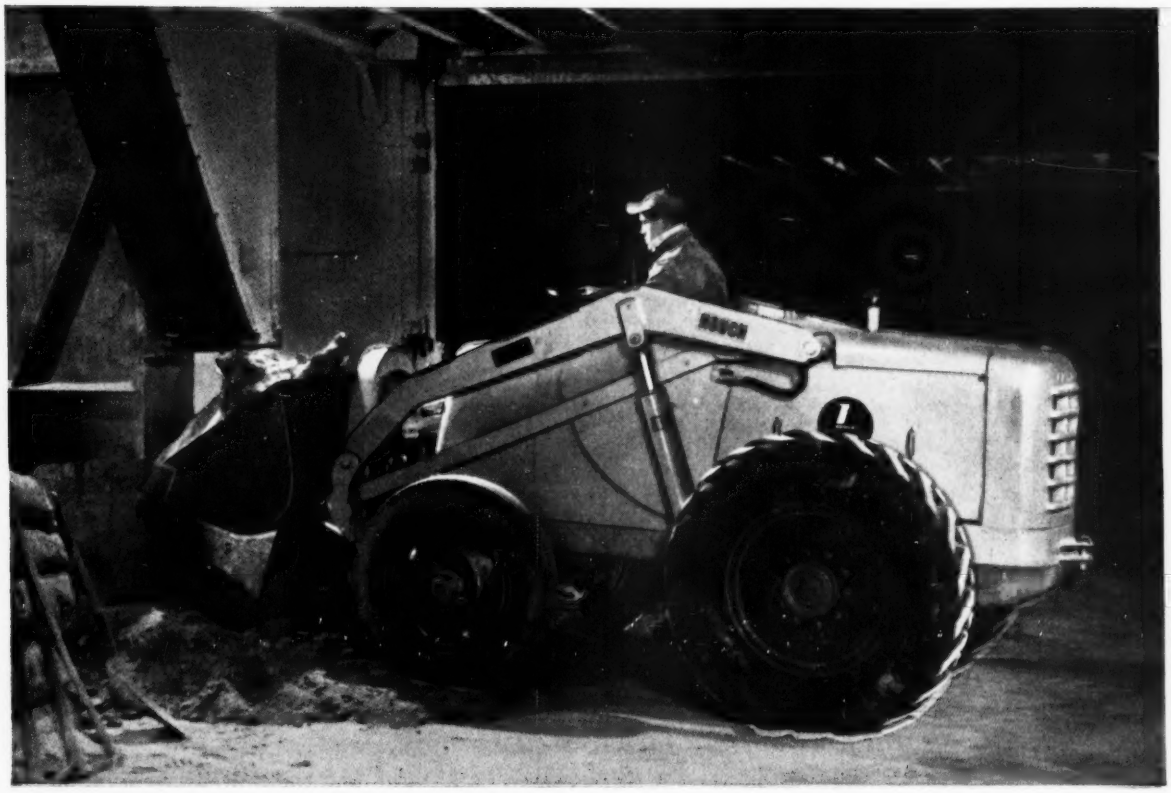

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Agricultural Economics, W.S.C., Pullman, Wash.

5:30-6:30 Film "THE COCKTAIL HOUR," Courtesy Pacific Northwest Plant Food Assoc.

7:00 Banquet, Stag. Toastmaster, Earle J. Shaw, Chilean Nitrate Sales Corp., 412 West Sixth, Los Angeles 14, Calif.

INDUSTRY AND AGRICULTURE TEAM ON PHOSPHORUS RESEARCH—Vincent Sauchelli, The Davison Chemical Corp., Baltimore, Md.

HOWDY! Larry G. Monthey, American Society of Agronomy, 2702 Monroe Street, Madison 5, Wisconsin.

July 2

Caravan to the Basin with alternatives:

#1 Tour Moses Lake pre-development farm and experimental work.

a. 10-11 A.M.

b. 11-12 A.M.

#2 Barbecue at Moses Lake.

#3 Tour of Engineering Works and Grand Coulee Dam.

#4 Tour of Soils and Crops experimental areas in Columbia Basin and at Washington Tree Fruit Exp. Sta., Wenatchee.

APFC — 8th ANNUAL MEET

The Homestead, Hot Springs, Virginia
June 11-14, 1953

Preliminary Program

THURSDAY, JUNE 11

Registration

4:00 P.M.—Ladies' Tea.

9:00 P.M.—Meeting of the Board of Directors.

9:00 P.M.—Game Night.

FRIDAY, JUNE 12

9:45 A.M.—Opening of the Convention. Invocation. In Memoriam Resolution.

10:00 A.M.—Address by the President.

10:30 A.M.—Address — Title: "Changing Policies in the USDA." J. Earl Coke, Assistant Secretary of Agriculture, United States Department of Agriculture, Washington 25, D. C.

11:00 A.M. — Address (Tentative Title: "Farm Prices and Production") Dr. T. K. Cowden, Head, Department of Agriculture Economics, Michigan State College, East Lansing, Michigan.

11:30 A.M.—Committees and Announcements.

11:35 A.M.—Annual Business Meeting. Reports of Committees; 1) Credentials, 2) Nominating. Election of Members to the Board of Directors.

11:45 A.M.—Adjournment. Golf and Tennis. Ladies' Events. After-Dinner Reception, Courtesy . . . Southwest Potash Corporation.

SATURDAY, JUNE 13

9:45 A.M.—Convention Called to Order. Address — (Tentative Title: "Congress and Farm Policy") The Honorable Clifford R. Hope of Kansas, Member of the United States House of Representatives and Chairman of the House Committee on Agriculture.

10:05 A.M.—Presentation of the Soil Builders Award.

10:10 A.M. — Panel — Agricultural Forum (Tentative Title: "Plant Food Potentials Across the Nation") Moderator: Dr. Paul D. Sanders, Editor, THE SOUTHERN PLANTER, Richmond, Virginia. Representing the Notheastern Section of the U.S.: Lester H. Smith, Extension Agronomist, University of Vermont, Burlington, Vermont. Representing the Southeastern Section of the U. S.: H. A. Woodle, Leader, Agronomy Extension Work, Clemson Agricultural College, Clemson, South Carolina. Representing the Midwestern Section of the U.S.: Dr. Arnold W. Klemme, Extension Specialist in Soils, University of Missouri, Columbia, Missouri. Representing the Far Western Section of the U.S.: Dr. W. E. Martin, Extension Soils Specialist, University of California, Berkeley, California.

11:20 A.M. — Address — "Sharpening the Tools of Sales Management." H. H. Maynard, Chairman, Department of Business Organization. The Ohio State University, Columbus, Ohio.

11:45 A.M.—Announcements and Adjournment. Golf and Tennis. Ladies' Events.

6:30 P.M.—Hospitality Hour, Courtesy . . . Potash Company of America.

7:45 P.M.—Banquet. Soloist — Felix Knight.

9:00 P.M.—Address by The Honorable Walter H. Judd of Minnesota, Member United States House of Representatives.

10:00 P.M.—Dancing.

SUNDAY, JUNE 14

9:30 A.M.—Breakfast Meeting — Board of Directors.

Surfactant Study Bulletin Offered

A new study of the use of surfactants in the manufacture of fertilizer by acidulation has been released by Universal Detergents, Inc. Copies of the report may be obtained by requesting Technical Bulletin 54, "Udet F in Acidulation," from Universal Detergents, Inc., 1825 East Spring Street, Long Beach 6, California.

Life Features FTE

FTE, the new substance to provide plants and crops with trace elements necessary to full growth and to restore vital minerals to deficient soil was publicized recently in Life Magazine.

The new product, developed by the Ferro Corporation of Cleveland, Ohio, after five years of research is described by life as one of the major agronomic developments of recent years. The article reports actual comparative plantings showing amazing differences between plants treated with FTE "fritted trace elements" and those not treated.

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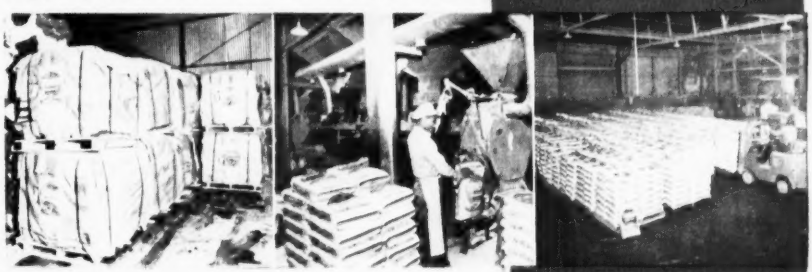

Unretouched photos of KRAFT-lok Multiwalls in use for packaging STONEMO (crushed granite) at Stone Mountain Grit Company, Inc., Lithonia, Ga. A clean, efficient operation all the way.

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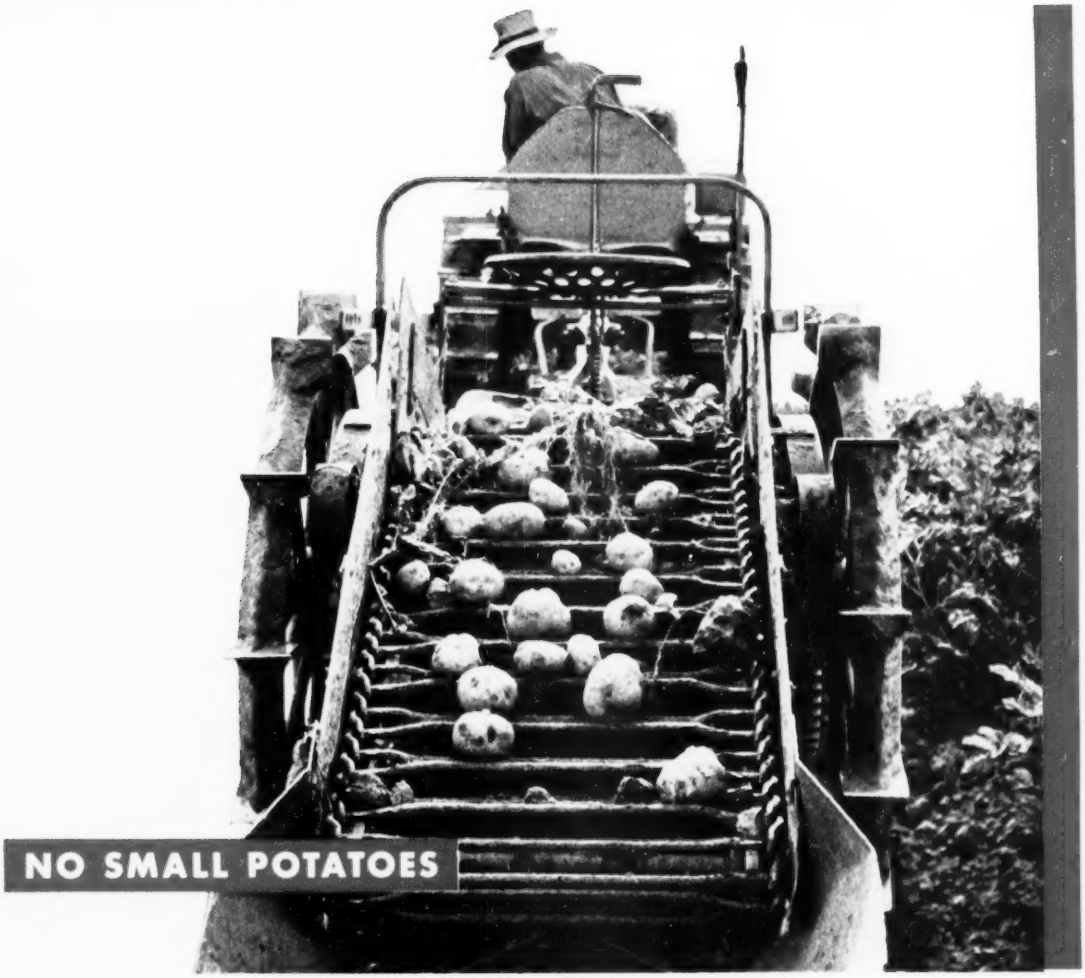

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HIGRADE MURIATE OF POTASH 62/63% K_2O
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Potatoes come from the soil, ultimate source of all animal and vegetable growth. Like all thriving crops, they drain the land of vital plant-food elements daily. Fertilizers help restore these elements.

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KOEHRING-SOUTHERN HOLDS OPEN HOUSE

Koehring Company, parent of C. S. Johnson Co., well known in the fertilizer field, held a six-day open house April 17-22 when the doors were thrown open at their new plant in Chattanooga, Tennessee. Each of the six days was devoted to a special group of guests, and the photographs shown here were taken when 175 Koehring products distributors from all over the US, Canada, Mexico and Puerto Rico were given first-hand information on Koehring equipment.

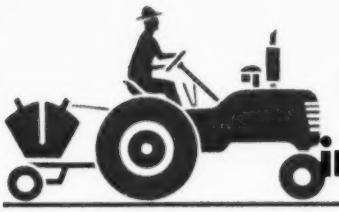
The center picture shows part of this group being shown the C. S. Johnson automatic bin and batching equipment—sales engineer Ray Russell telling them about it.

On hand as hosts for the event were some 30 officers, directors and members of the sales organization from Johnson and other Koehring companies, and the program included guided tours through the modern 800 x 120-foot plant.

The plant, located on Manufacturers Road, was acquired by the Koehring Company in early summer 1952; it is ideally located, being near both water and rail transportation. The Koehring Company plans to use the property adjacent to the plant for testing and experiments. When in full operation, they expect to employ around 500 men.

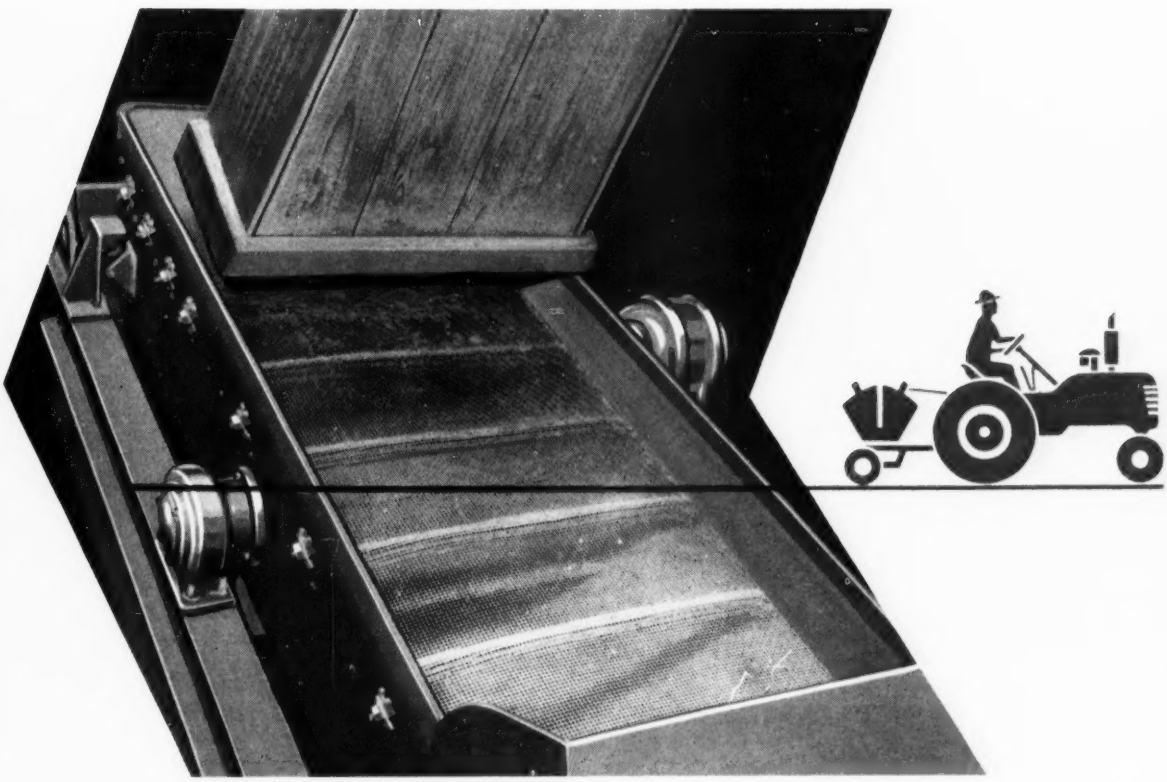
A tour through the plant showed $200,000 worth of the latest in tools and equipment; excellent working conditions for the men. Safety was emphasized throughout the plant and every step taken to insure it.

Following the open house, the Koehring Company entertained at a dinner at the Patten Hotel. Present were officials from the Koehring Company, including G. E. Long, Chairman of the Board, J. R. Steelman, President, E. A. Brugger, Vice-President, in charge of production. Also present were Chattanooga city officials, including Mayor P. R. Olgiati.



two SIMPLICITY gyrating screens team up to speed basing operations in fertilizer production

Two Simplicity Gyrating Screens keep operations humming at this large Southern fertilizer plant. Working as a team, they handle the output of two 14" x 7" bucket elevators. A 3' x 8' Model "LS" Simplicity Single Deck Screen handles as much as 50 tons of super phosphate per hour; and a 3' x 6' Model "C" Simplicity Single Deck Screen handles all other fertilizer ingredients at about the same rate of speed. Both screens are set at 20° and rotate with the flow of materials. There is virtually no blinding, as the screen in the photo, which has not been brushed or cleaned, shows. The splendid performance of this Simplicity team is typical of the fine job Simplicity Screens are doing throughout the fertilizer industry. They can help speed up operations and increase production in your plant, too. Write us today for complete information.



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- **Sales representatives in all parts of the U. S. A.**
- **FOR CANADA:** Canadian Bridge Engineering Co., Ltd., Walkerville, Ontario
- **FOR EXPORT:** Brown and Sites, 50 Church Street, New York 7, New York

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Dutch FIRM'S POST WAR EXPANSION

By J. GRINDROD

Now holding a leading place in the Dutch superphosphate industry Albatros Superfosfaatfabrieken, N. V., of Utrecht has spent some 24 1/2 million gulden on modernization and extension since the war.

The firm, which this year is celebrating its 75th anniversary, manufactures superphosphate, triple superphosphate, ammonium phosphate, sodium silico fluoride and technical phosphoric acid, also trisodium phosphate and concentrated compound fertilizers, and now has works at Amsterdam, Kralngsche Veer, near Rotterdam, and at Pernis on the New Waterway. In addition, there are daughter companies in Africa and Canada, owned jointly by Albatros and Fisons Ltd., and there is an American factory at Caribou (Maine).

Before the war the Amsterdamsche Superfosfaatfabriek-Vereenigde Chemische Fabrieken (A.S.F.-V.C.F.), as it was then called, consisted of five factories (apart from affiliated companies elsewhere), two of which were in Rotterdam and one in Amsterdam. Two smaller factories were operated at Groningen and Zwijndrecht. The two smaller works were destroyed by enemy action and the three larger factories deteriorated badly during the war owing to the impossibility of proper maintenance and the complete suspension of production.

With the rapid progress of the fertilizer industry in general during the war years it became evident that if the Dutch superphosphate industry wanted to regain its position in the post-war period an extensive programme of renovation and modernization would have to be embarked upon. In view of the trend toward higher wages and increased transportation costs Albatros drew up plans for the manufacture of more concentrated fertilizers and for greater mechanisation within the factories and at the wharves and loading sites.

Consideration was given mainly to the manufacture of high grade fertilizers and granular fertilizers. The output of phosphoric acid was greatly increased when the new phosphoric acid plant with contiguous evaporation plant at Pernis was put into production.

In order to ensure a larger supply of sulphuric acid a small plant, burning hydrogen sulphide, a waste product from the adjacent oil refineries at Pernis, was built. This operates in such a way as to make full use of the heat, which is converted into steam. Further plans along these lines have been considered for extending the sulphuric acid production but these have been suspended for the time being.

Granulation plants, partly for the granulation of powder products processed by existing plants, and, also, combining processing and granulation, have been erected at Amsterdam and Pernis. These installations can be used for superphosphate and triple superphosphate as well as for compound fertilizers.

These developments necessitated the replanning of the research department which has crystalized into the formation of a Central Laboratory for all the factories, with pilot plant facilities.

Mechanization was carried out in conjunction with the installation of the new processing equipment and modern facilities are available in all factories and at the wharves. Cranes,

(Continued on page 47)

Phosphoric Acid Plant At Pernis, Holland

Some Aims OF SOIL RESEARCH

Wm. A. Albrecht
University of Missouri

Much as the definition of research depends on the person doing the defining, so the aims of research may depend on the one who is aiming. If, on this occasion, our discussion is to be limited to research in the strictest sense of the term, we may define it as the addition to the sum total of our knowledge already recorded. In many cases research is said to be the effort resulting in a discovery. But too often what some one believes he has discovered, is a discovery only for him. It may be an addition to his knowledge, but by that token for him it is not necessarily an addition to the total of knowledge. Learning by one of us, or the discovery by some of us of facts already within the sum total of knowledge, is not research. For that reason in cases of claims for credit for research, the question of knowledge already recorded (preferably by the printed page) serves to establish priority and classification as true research. Other methods of record can also serve.

For our purpose here, let us exclude from true research the repetition of previous researches for greater refinement, and of facts already established and reported. Modern techniques of measurement permit refinements today which were not possible a short time ago. For example, in animal feeding trials in low winter temperatures and those higher in summer, and in animal calormietry, it was established long ago that the animal accommodates itself, by means of extra feed, to temperatures going downward below 70°F. But the animal cannot accommodate itself so readily to temperatures going upward above 70°F. Now with modern refrigerator aids and heating apparatus, it is possible to study the animal's physiology by increments as small as a degree or two, and thus refine the basic facts of former research. This repetition under more refinement scarcely is research unless it adds new facts and new principles, or it shifts the temperature figure previously established.

I

Research in its evolution of new knowledge usually includes four steps or four phases, namely (a) observations, (b) theories prompted by observations, (c) experimental tests of the theories, and (d) conclusions drawn from the results of the tests. If any of these phases are omitted; if any are out of proper sequence; or if any are in error, a new fact or truth will not be established, and thereby the efforts fail to be research in the stricter sense. Research must represent a new theory, a new idea, some new casual connections, new explanations, and new results.

Observations More Fertile In Ideas Provoke More Fruitful Research

The starting point of research is usually some observation. This is not merely an ocular experience. Instead, it is such connecting itself with a mental one that views this in relation to other observations and other mental experiences. It is the thought activity aroused by what one sees that starts all the other thought sequences composing the research. Keener observations can bring on the better research. Even an Aesop's fable points to excellent observations by the Arab accused of stealing a camel, even if he had not seen it but had observed the evidence of its behavior and evidence of its visible properties. His ocular experience omitted the animal, but yet he was able to describe it by reporting that it was blind in one eye, lame in the left hind leg, devoid of two teeth, numbers three and four, in the lower jaw, and loaded with wheat on one side and honey on the other. These were what he visualized the camel appeared like from footprints, by the way and place where it had grazed, to say nothing of leakages of visible wheat and honey from its load. Researchers of note generally point back to some discriminating observations for their origin or their provocation.

Theories Of Value For Test Call For Broad Vision In Their Conception And Birth

The degree to which an observation provokes a theory regarding the causes of the observed phenomena, or other hypothetical matters, depends much on the breadth of one's acquaintances with other phenomena bearing some similarity to the one observed. If one has a limited acquaintance with facts organized into other sciences, then the generation of a theory by the mind as a result of a particular observation is not so probable. For example, if one knows nothing about the various parts and behaviors of an automobile by which it runs, one is in poor position to theorize or diagnose the why of the sudden disfunction from the observation of its suddenly ceasing to run. The mental processes generating the theory, or hypothesis, determine the uniqueness of the research, or the newness of the ways and methods by which the whole effort of establishing some new truth, some new fact, or some new knowledge is guided.

*Paper given at meeting Middle West Soil Improvement Committee, Chicago, Feb. 1953.

Mechanical Ingenuity And Other Acumen In Designing Tests For Theories Enhance The Potentialities Of Research

While a theory is in its mental birth pains, the parturition of it will be hastened if in the mind's eye there is contemporaneously associated also some vision of the methods, the mechanics, etc., by which the hypothesis or theory may be tested. The readiness to have such visions for testing may be the invitation to bigger matters, both in theory and in the finally established truth. Visions of how causes can be controlled, how effects from specific and controlled causes can be detected, measured and correctly ascribed, are provokers of more complex theories and of more far-reaching results of the research. Such visions are also the guardians against failures in establishing the theory correctly and against the incidence of unexplainables by which the thought processes are aborted from carrying through to sound conclusions.

In the birth of the theory combined with the vision of procedures for the testing of it, there rests the real character of any research. The degree to which each separately and the two combined are unique determines, as a rule, the degree to which the resulting new knowledge may, in general, be a real contribution. One of these without the other is not research in the fullest sense. Testing by itself, for example, is common practice. While this may collect and tabulate data, it fails too often to contribute knowledge to establish a fact or to help in formulating new principles. Testing the breaking strength of 100 oak beams, all of the same dimension and conditions gives an average figure as information. It serves for comparison with the same figure for yellow-pine beams under the same condition. In the fullest sense, however, this can scarcely be research, though many are wont to classify it as such. The test in this case took off without any theory. Much in agriculture that is testing is by no means research in the sense of being an addition to knowledge, even though it may be a case of collecting valuable information. Trying a new plant species on a soil where it has not been previously grown is testing, but certainly not research when the plant's physiological requirements are unknown, when there is no hypothesis contending that these can be satisfied by the fertility which the soil offers, and when one takes off for the test with no more mental or mechanical assets or equipment than the specimen of new seed.

Searching for and hoping to multiply varieties of wheat resistant to covered smut by inoculating a good number of them, each with an equally large number of different strains of the laboratory-segregated smut spores, is only a test. This is true since even a smutted seed may give a plant of which many heads give smut-free seed. The fact that the seed as the unit of transmission does not guarantee its offspring as either all smut-free or all smut-infested, makes the search in vain. Efforts of this nature must be sterile of results since they are emasculated before they take off.

Other examples may come into your mind to emphasize the fact that the major determiners of fruitful research are an excellent theory coupled with excellent tricks and techniques for testing it, so as to leave no doubt about the causes and effects concerned. Even during the testing of the theory careful observations must still be part of the procedure.

Excellence In The Observations, In The Theory, And In The Testing Of It, Is Not Necessarily Guarantee Of Correct Conclusions

The conclusions drawn from tests are not necessarily faultless even if the observations, hypotheses, and the tests of them were such. Lack of sound logic in drawing the conclusions from all that preceded may be a pitfall for those efforts, however noble. As an example, it was a correct observation that forages are less nutritious when grown on soils naturally more acid and that more nutrious forages like red clover failed in increasing percentages of seedings as soils were more acid. It was a sound hypothesis to associate this crop failure with the acid condition of the soil. In testing this hypothesis by using the carbonate of calcium on the soil to reduce the soil acidity, the successful reestablishment of this legume invited the erroneous conclusion that the high degree of the soil acidity was the major cause of the clover failure.

This erroneous conclusion soon grew into propaganda on a national scale, claiming that we must fight soil acidity with a carbonate (or oxide or hydroxide) of calcium for the elimination of soil acidity, if we are to grow red clover. These conclusions failed to realize their error of logic known as the "divided middle." When clover grew as the result of the application of lime, and when reduced acidity in degree and in total was also the result of the application of lime, it was erroneously concluded that the reduction in acidity was the cause of the better growth of clover. The words, "the result of the application of lime" was the "divided middle" in the syllogism. Liming the soil was the **application of calcium** (Lime) for the better growth of clover. Liming the soil was the **application of the Lime carbonate** for the reduction of the acidity.

The observation of Benjamin Franklin reporting that clover grew better as the result of the application of calcium sulfate, which does not reduce the acidity, was not included in formulating the hypothesis regarding soil acidity (or sulfur deficiency) as the cause of clover failure. Neither was sodium carbonate and carbonate other than that of calcium, nor calcium chloride and salts other than the carbonate included in the test of the hypothesis by which the erroneous conclusion might have been prevented. This fallacy of logic has delayed by many years the appreciation of the beneficial effects by the hydrogen in the soil, of the value of the reserve fertility in the silt minerals, of the differences in the root acidity

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in the root dynamic of different crops, and of the different synthetic services by crops as their roots represents different potentialities for taking fertility from the clays or even from mineral fragments. It has also delayed the appreciation of the wide differences; in terms of influence on pH; in terms of ionic activities; and in terms of plant nutritional services by a single cation when added in the same amounts to different colloids.

In research it is the mental processes more than the manual manipulations of testing; that determine the result of the research. Consequently, the high aim of the research will not be possible unless the thinking is of broad scope, in regular order, and correct in every step in the procedure.

II

A few aims of some soil research, rather than what soil research in total is aiming to do, may be briefly outlined here.

Colloidal Clay Suggested Itself As The Dynamic Soil Separate In Plant Nutrition

For many years our soil research has aimed to understand how the soil can hold the plant nutrients in sufficient supply for an entire season of crop growth when the same supply, if put into a solution as plant growth medium, would demand—for the necessary dilution—more water than the soil could retain within root reach. If put into solution in the water within root reach, the resulting high salt concentration would kill the seedings.

As another aim in soil research, the dynamics of ionic absorption and exchange suggested the theory of a contact area of the colloidal root and colloidal clay as the center of the chemo-dynamics by which nutrients are held in quantity and exchanged to the advancing root, offering for them the active hydrogen originating in root respiration.

Fortunately, for these aims, some funds which had accumulated from the sales of legume inoculation, and an able young Swiss chemist reluctant to leave the United States after the expiration of his scholarship visa, were the combination to facilitate the testing of the colloidal clay-root contact hypothesis, in spite of the aspects of soil bacteriology, plant physiology, and biology in general, then still strange to this Swiss scientist of promise. Here was the first research aiming to shift the concept of plant nutrition from the hydroponics demanding dilute and repeatedly replenished solution to that of nutrient adsorption on the clay and then exchange from there to the plant by the colloidal clay-root contact.

With the claypan soils, or the planosols, covering such extensive areas but considered such problem soils in spite of their mechanical suitabilities, they were hypothetically considered as having advantages in research and in practice. They were so considered because of the amount of claypan and the nature of its clay, when this soil separate is viewed as the seat of much chemo-dynamics for plant nutrition according to this newer concept. It seemed logical, therefore, to aim the research at this clay as the first one of the three soil separates to be studied independently of the others, namely, the silt and the sand fractions. It was the aim to envision and comprehend the chemo-dynamics between the finest clay fraction—capable of more complete standarization in chemical behaviors—and the advancing plant root. Here soil and plant nutrition as cause and effect, respectively, were envisioned in the most limited soil area for control and study.

It was by means of the electro-dialyzed clay of smallest particle size that there was demonstrated the movement of the hydrogen, a non-nutrient, from the root to the clay. Other cations, both nutrients, and non-nutrients, were shown to be going from the clay to the root and even in the reverse direction, namely, from the growing root to the clay in the substrates. These researches gave opportunity for, and birth to, many more theories and hypotheses for experimental testing. That soybean plants grown to contain less nitrogen, less phosphorus, and less potassium than the planted seed (and at about this time when this newer crop was being propagandized as "a hay crop but not a seed crop") gave impetus to several more theories about soil and nutrition of plants, but at the nutrition of animals compelled to eat any quality of vegetation so commonly included under the term "hay".

Like many other research tools, the colloidal clay was a new means of more refined control (a) pH, (b) of the degree of ionic saturation of the clay, (c) of the ratios of these saturations by different ions to each other, (d) of the influence of these ratios on the ionic activities of the absorbed ions, and (e) of all of these factors as they modify not only the mass of vegetation produced but also as they modify the ratios of carbohydrates to proteins, vitamins, etc., synthesized by the crop plants. Such changes in organic composition of the crop were shown to be manifestations of physiological differences, within the same plant species, caused by differences in the suites or combinations of the nutrient inorganic ions absorbed on, and exchanged to the root from, the clay colloid according to their respective activities there.

It was the aim of the research, using the colloidal clay technique, to study also the organic molecules in the soil. The results in terms of ionic movements by calcium, for example, into the plant roots were particularly different when a large one like methylene blue was adsorbed on the clay as the ion accompanying the calcium. This organic molecule eliminated the differing degrees of calcium saturation as a factor in variable calcium uptake by the plant roots from a constant exchangeable amount in the soil. This was the first work demonstrating a different behavior by the exchangeable calcium on the clay when in company with a large organic molecule adsorbed there. Other phases of this concept, or theory, of the behaviors of the ions absorbed on the clay varying, not according to the amounts exchangeable but according to the company they keep with other ions (nutrient

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or non-nutrient) and even when exchangeable amounts are constant, have now become so ramified and numerous when treated by only chemical procedures, that they may become still more numerous when measured by crop creations of compounds representing nutritional values for animals.

It was another aim of the research, using the colloidal technique, to study the influence of the variable composition of the plant root on the movement of different absorbed ions from the suite of them on the clay. This demonstrated the much greater percentage of absorbed and exchangeable potassium ion moved from the clay into the root when this was a legume in its physiological behavior because of bacterial inoculation than when it was physiologically a non-legume in the absence of these symbiotic microorganisms. It demonstrated also a much wider ratio of weights of plant legumes in the rotation were depleted of their fertility much more rapidly than under rotations without legumes, the concept regarding legumes as soil-improvers notwithstanding. Naturally then the non-legumes can be grown on the same soil for many more crop successions than the legumes.

Whether the plant is producing mainly carbohydrates or is converting much of these into proteins is significant in many aspects connecting themselves with the suite of ions going from the soil into the roots and thereby the plant.

Such differences in movements of the ions from the exchange complex of the soil into the root when protein production by microbial addition to the soil was responsible, illustrates the impossibility of considering production of forage bulk as an index of what might be considered as efficiency of ions in their effects on plant growth. Soybeans as non-legumes produced more hay per unit of exchangeable potassium taken from the soil than the soybeans as legumes. When potassium is accompanied by the chloride ion in tobacco fertilization, the yields are higher per unit of potassium than when used in the form of the sulfate. Shall we see the sulfate effective in producing a higher concentration of protein in the tobacco leaf and thereby respiring more carbohydrates to bring this about and prohibiting the high bulk of carbohydrates accumulated as yield? Shall some research aim to study tobacco for its possibly increased sulfur-containing, amino acid content, namely, methione, when potassium sulfate is the fertilizer rather than potassium chloride? Difference in the synthesis of the protein for these fertility reasons may well be casually connected with the difference in the quality of the tobacco recognized in connection with these two kinds of potassium fertilizers on tobacco.

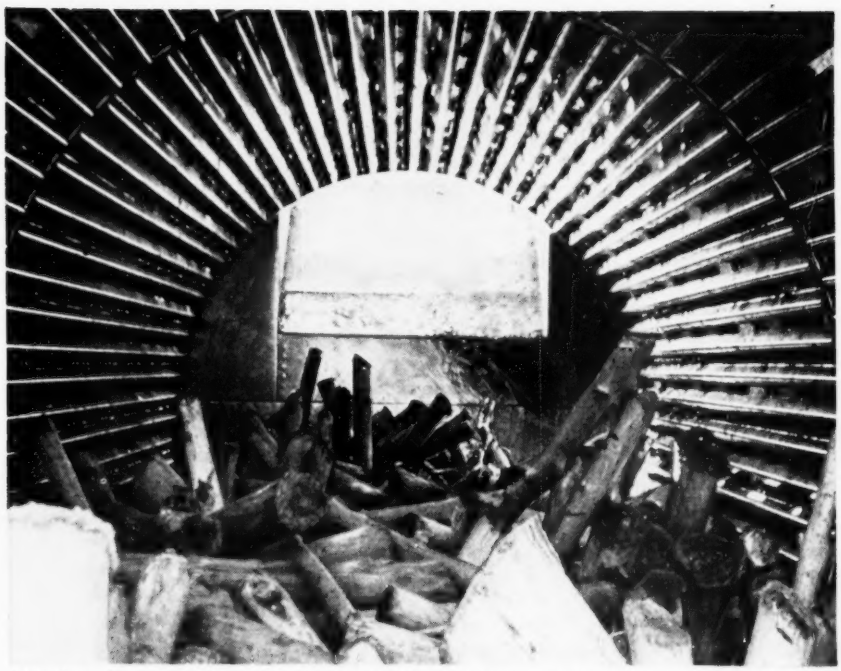
Wide differences in the amount of plant bulk resulting from a single unit of nitrogen illustrate well how widely what we might erroneously call efficiency of a nutrient element may vary according to the plant's synthetic performances used in measuring that efficiency. According as the plant produces more carbohydrate and less bulk, the efficiency of nitrogen as nutrient would be considered to go higher. According to the theory of Willcox, the maximum amount of nitrogen to be taken from an acre of soil should give over six tons of dry matter per acre in soybean forage; over thirteen tons per acre in corn; and almost fifty-six tons per acre in sugar cane, all of these from 318 pounds of nitrogen, or ten baules of this element. It should be the aim of research to clarify the concepts of the services by nutrients coming from the soil, if yields of bulk of such wide ranges from the same application of nitrogen are possible.

Mineral Reserves In The Silt Separate Become Available Nutrients Under Processing By Acid Colloidal Clay

The research aiming at clay properties alone has shown this soil separate to be the seat of the chemodynamics of nutrition of plants (and microbes) growing in the soil. But it required only a few observations and tests of plant growth on colloidal clay media to demonstrate how much more rapidly the colloidal clay could be depleted of some active ions than of others. As much as 85 per cent of the exchangeable potassium was taken by a single legume crop. This suggested the theory of variable plant physiological performances as a result of relatively different rates of fertility depletion for different ions by the same species of plants grown in continued succession on the same soil. This was likewise suggested for a single plant within its seasonal growth period.

It raised the question and hypothesis regarding the chemi-dynamics serving to restore the productivity of soils when "giving the land a rest." It called for the belief in, and the study of the silt separate as the mineral source of nutrient ions, broken out of these reserve minerals rejuvenating the rested land. It called for the theory that the acid clay may be processing soil mineral fragments just as any acid would. It called up the concept that clay acids were processing limestones to make their calcium and their magnesium active, and processing phosphatic rock to activate the phosphorous. In fact, this theory was the start of the concept of the degree of development of the soil as the major factor in determining the soil producer of protein more closely with the climatic forces developing soils from rocks and minerals.

A long list of theories, and these formulated into experimental tests for research, naturally resulted to concern themselves with the silt fraction of the soil. The silt deposits within the Missouri River bed, the loess deposits constituting the bluffs along that river, and the loessial mantle over glacial till extending northeastward away from the river in the line of the prevailing winds blowing from the southwest, all suggest themselves as factors in explaining the extended time period during which the Cornbelt soils have maintained their protein-producing capacity. The mineralogy of the soil is now a returning and revived research aim. Professor E. W. Hilgard, author of the early



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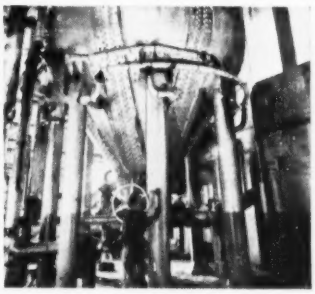

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work on soils under date of 1914, recognized, at that early date, the mineral reserves in the silt more than he did the fertility absorbed on the clay fraction, as the sustaining fertility of soils under a long period of regular productivity. Aided now by progress in the science of mineralogy, the colloidal clay acid comes into crop production via its action in processing the insoluble compounds of the starter fertilizers it adsorbs and exchanges to the plant roots.

As the result of the specific aims of soil research just cited, the possible maintenance, then, of soil fertility comes into clearer comprehension when we visualize the chemo-dynamics of the clay fraction. This fraction of the soil serving as the "jobber", is not only an adsorber and exchanger, but is also a processor of the raw minerals to keep the soil's assembly line weathering the minerals and rocks so that the active inorganic nutrient ions are passed by exchange procedures from them to the clay and from the clay to the plant roots. Going in the opposite direction there is the hydrogen ion, possibly others, generated in the root's colloidal atmosphere by root respiration to be taken by the clay and passed on to the silt fraction where it expends its activities in decomposition of the minerals of this separate.

This concept of the chemo-dynamics delivering nutrient ions to the plant root from the mineral reserves in the soil, makes the climatic pattern of soil development as plant nutrition explain the ecological array of plant species, especially when these as legumes or other plants synthesizing proteins complete for animal nutrition more than mere producers of vegetative bulk, are concerned. With an understanding of the wide variations occuring in the suite of nutrient ions active around the plant root, it becomes logical to direct research into the wide shifts in the ratios of carbohydrates to crude proteins and the shifts in the array of different amino acids within the same plant species resulting from the shifts in the ratios of exchangeable ions offered by the colloidal complex of the soil growing the crop. It is also logical to aim some research at the response by the growing animal bodies, by the animal reproductive processes and by even human physiological processes, according to the varying fertility of the soil growing the feeds and foods by which these higher living forms are supported.

Just what soil research is aiming to do depends on the individual who is aiming. It will depend, not on a majority vote of any scientific body assembled, nor on agronomists grouped according to geographic, agricultural, or economic categories. Rather the aim of research will be higher as the vision of the researcher can be extended by more basic facts at his command for extrapolation of his thinking far enough into the unknown for maximum benefit to agriculture and all that is dependent on it.

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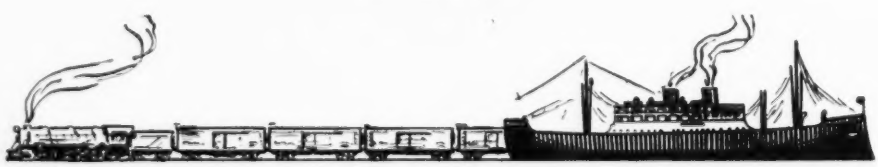

PROGRAM 11th ANNUAL CONVENTION

Association of Southern Feed and Fertilizer Control Officials

THE CLEMSON HOUSE (HOTEL) June 22 and 23, 1953, CLEMSON, SOUTH CAROLINA

Monday Morning, June 22, 1953
Executive Session

8:00—Registration.
9:00—Executive Session.
10:30—Committee Meetings.
12:00—LUNCH.

Monday P.M., June 22, 1953
General Session

1:15—Invocation—Rev. Geo. Cannon, Pastor, Clemson Methodist Church.
Roll Call.
Reading of the Minutes.
Report of Secretary-Treasurer.
Announcements and appointments of committees.
Welcome—Dr. R. F. Poole, President, Clemson College.
Presidential Address—J. J. Taylor, State Chemist, Department of Agriculture, Tallahassee, Florida.
"Public Relations"—Dr. Webster Pendergrass, Extension Agronomist, University of Tennessee, Knoxville, Tenn.
"New Uses of Insecticides in Fertilizer and Soil Toxicity Studies"—Dr. M. D. Farrar, State Entomologist, S. C. Experiment Station, Clemson, S. C.
"Minor Elements, Availability and Residual Effects"—N. R. Page, Associate Agronomist, S. C. Experiment Station, Clemson, S. C.
Discussion.
7:00—BANQUET (Informal), Clemson House.
Toastmaster—B. D. Cloaninger, Clemson, South Carolina.
Introduction of Speaker—D. W. Watkins, Director, S. C. Extension Service, Clemson, South Carolina.
Speaker—J. A. Rogers, Director, Public Relations, Coker's Pedigreed Seed Co., Hartsville, South Carolina.
9:00—Film—"South Carolina"—courtesy Esso Standard Oil Company.

Tuesday Morning, June 23, 1953
General Session

8:30—Film—"Cash In On Corn"—Courtesy N.F.A.
"Chemical Control in Industry"—T. C. Law, Law & Company, Atlanta, Georgia.
"The Relation of Nutrition to Fertility in Dairy Cattle"—G. W. Brandt, Associate Dairy Husbandman, S. C. Experiment Station, Clemson, S. C.
PANEL—"What Population Can Be Fed Adequately by American Farms?"—Dr. H. P. Cooper, Dean and Director; Dr. E. J. Lease, Nutritionist; Dr. G. H. Aull Head, Department of Agricultural Economics and Rural Sociology, S. C. Experiment Station, Clemson, South Carolina.
Discussion.
Committee Reports.
Unfinished Business.
Election of Officers.
12:00—LUNCH.

Tuesday Afternoon, June 23, 1953

1:00—Executive Session.
4:00—Tour—College Campus and Experiment Station (mount busses in front of Hotel)
7:00—Buffet Supper—Saber Room, Clemson House.

ENTERTAINMENT FOR LADIES AND CHILDREN
Monday, June 22, 1953

LADIES

10:00 a.m.—Tour of Campus by Bus (meet in front of Hotel)
4:00-5:00 p.m.—Tea—Residence of Mr. and Mrs. B. D. Cloaninger, 111 Strode Circle (Transportation leaves in front of Hotel at 4:00 and 4:30 p.m.)
7:00 p.m.—Banquet, Saber Room, Clemson House.
9:30 a.m.—Swimming and or pictures — Y.M.C.A. Building—Free Passes—Life Guards, Chaperons, transportation provided (meet in front of Hotel at 9:30 a.m.)
4:00 p.m.—Swimming and free picnic supper, Oconee State Park, transportation, Life Guards and Chaperons provided.
9:00 p.m.—Film — "South Carolina" — The Clemson House.

Tuesday, June 23, 1953

LADIES

10:00 a.m.—Coke Party—Farmers Club, Clemson House.
7:00 p.m.—Buffet Supper—Clemson House.

CHILDREN

10:00 a.m. to 4:00 p.m.—Day Camp—Oconee State Park—(transportation, chaperons, Life Guards and lunch provided)
7:00 p.m.—Buffet Supper—Clemson House.

GEORGIA PLANT FOOD EDUCATIONAL SOCIETY MEETING SCHEDULE

June 25, 12:30-3:00 P.M. Atlanta.
Banquet honoring winners in Georgia Grazing System Contest. (The contest is sponsored by our Society.)
June 25, Atlanta Directors Meeting.
Fertilizer Dealer—Salesman—Extension Service.
One day meetings:
July 7—Northeast Georgia, (Dist. 1)
July 8—Northwest Georgia, (Dist. 2)
July 14—Southwest Georgia, (Dist. 4)
July 15—Southeast Georgia, (Dist. 3)

THE USE OF SECONDARY AND MINOR ELEMENTS IN FERTILIZER

By R. P. Thomas[2]

Fertilizers are used by man to maintain an adequate supply of nutrients in the soil to grow good crops economically. Since soils are different in their origin, mineral content, and stages of development, they naturally vary in their nutrient levels and need of supplemental plant food. Associated with these different soil nutrient conditions are large deviations in nutrient requirements of crops, as well as wide variations in the cropping and cultivation practices of man. All of these conditions have tended to stress this wide difference in the nutrient requirements of soils. For a long time it was believed that the nutrient needs could be supplied entirely by lime and varying amounts of nitrogen, phosphoric acid and potash. With the progress of time, it was learned that there are other elements also needed for plant growth. A brief discussion of these other elements and reasons for their need in fertilizer mixtures is presented here.

Chemical analysis of plant materials show that they are composed largely of carbon, hydrogen and oxygen. These elements are obtained by the plants from the atmosphere, soil, air, and water. Associated with these three organic elements are the principle constituents of most mixed fertilizers, nitrogen, phosphorus, and potassium, which are commonly spoken of as the major plant foods or nutrients. Other elements were soon found to be both necessary for plant growth and also sometimes lacking in soils. These elements are listed as of secondary importance and consequently named secondary plant foods. They are made up of sulfur, calcium, magnesium, iron, chlorine, and sodium.

Sulfur is found in the nuclear proteins and similar complex compounds of a plant in close association with phosphorous. Its chief source of supply in our normal fertilizer is from the superphosphate as this material usually contains more sulfur than phosphorus. There is some sulfur in our air which is returned to the soil by rains. This quantity is small except in congested or manufacturing areas where several pounds per acre may be turned into the air from coal and gas fumes. Sulfur is also contained in many fertilizer mixtures in the sulfate radical of ammonium sulfate, potassium sulfate, Sul-Po-Mag, and Keiserite. Since most of the ordinary mixed fertilizers contain more sulfur than phosphorus, soils receiving liberal applications of mixed fertilizer made from normal superphosphate have usually no sulfur deficiency problems. Many of our soils contain ample sulfur for normal plant growth and many soils are also deficient in sulfur. Sulfur deficiency may arise in the near future on many of our soils when fertilizer mixtures are made from concentrated superphosphate as this phosphorus carrier contains little sulfur. Sulfur deficiencies in fertilizer may be easily corrected as there are many fertilizer materials and by-products carrying sulfur.

Calcium is another one of the secondary elements supplied in fertilizers. It is also one of the essential elements for plants which is often deficient in soils. The superphosphate and some of the nitrogen materials are the usual carriers of this element in fertilizers. It is also often added in the fertilizer filler as dolomite. Closely associated with calcium is the element magnesium, although the calcium need in both the plant and soil is usually several times that of magnesium. In normal fertilizers, magnesium is often contained as impurities in the superphosphate and lime filler. There are several specific magnesium carriers such as Sul-Po-Mag and Keiserite which are used in fertilizers.

In many areas the calcium and magnesium needs are critical because of improper soil management and inadequate liming programs. Many have suggested that these inadequate lime uses are partially the result of the state lime programs, since often much or more emphasis has been placed on using a cheap lime product than on the actual lime need. Consequently, private individuals, or the ones who would normally promote lime use to his neighboring farmers in our free enterprise system, do not make enough profit out of their sales to stimulate lime use. Perhaps proper and adequate lime levels in a soil have also been stymied by the more or less universal recommendation of slowly soluble lime carriers when there was an immediate large need in the soil for soluble calcium and magnesium. Most of the better fertilizer companies have recognized

1. This paper was presented at the Southern Section of the American Chemical Society, Auburn, Alabama.
2. Manager, Technical Service Department, International Minerals and Chemical Corporation.

the inadequate lime program of the average farmer and have corrected it by adding enough soluble calcium and magnesium to supply the critical need of the immediate crop. This practice has been very profitable to both the farmer and the fertilizer producer.

Another secondary element which is very necessary for plant growth is iron as it is essential in the formation of chlorophyll. Usually very little thought is given to iron by fertilizer producers. It frequently occurs as impurities in the phosphate carriers and certain of the nitrogen materials, as well as some of the fillers. Probably one reason for this seeming lack of consideration on the part of the fertilizer manufacturer is that most soils contain considerable iron. There are, however, many soils which do not contain enough available iron for proper plant growth. This lack of iron in the soil may be either from a very low amount of iron or from a lack of available or soluble iron in the soil. Recently, there has been a trend to include some of the soluble iron carriers in the premium grades of fertilizer.

Chlorine is another element which is often included in the list of secondary elements. The exact function of chlorine in the plant is little understood. It seems to be associated with the water movement within the plant. The principal fertilizer source of this element is the muriate of potash. There are many instances in which too much chlorine has been applied in our fertilizer for good crop quality. Two specific examples of this are the tobacco and potato crops. There are some indications where large fertilizer applications have been made for several years that there may be too much chlorine present for some of the other nutrients. As long as muriate of potash is the chief carrier of potash there will not likely be any lack of chlorine in our fertilizers.

Closely associated with chlorine is the element sodium. Formerly, most of our fertilizers contained ample or excessive amounts of sodium as impurities in the potash carriers and in the nitrate of soda.

Dr. R. P. Thomas

Now most mixed fertilizers carry relatively little sodium. No special function has been assigned to sodium in the plant although it is very important to the animal. There have been many instances of considerable stimulation in plant growth through the use of sodium. Many of the special or super mixtures or brands of fertilizers now sold contain added quantities of sodium, usually as sodium chloride.

There are many elements other than the above mentioned which are now known to be necessary for satisfactory plant growth. The role of most of these elements has not been very satisfactorily described. Most of them are associated with the chlorophyll and cell growth so probably they are essential in the synthesis of some of the organic compounds. These elements are manganese, copper, zinc, boron, molybdenum, and cobalt. Strontium was just recently added to this list by workers in New Jersey. Cobalt is the other element that is not included in this essential list by many people. They refer to cobalt and sodium as more essential to animal than plant growth. However, there are many reports which show a good stimulation in plant growth by the use of cobalt. Since it takes only a small amount of these elements to supply the nutrient need of plants, they are often spoken of as trace or minor elements. Many of these minor element carriers are being added to our mixed fertilizers. Usually such fertilizers are the special or premium grades although there are some producers who include a few pounds per ton of one or more carriers of these elements in every ton of fertilizer made.

The interest in minor elements by the fertilizer industry has increased until in some sections they are considered as important as the major plant foods. Basically, our often called "selfish interest" is really to produce a better fertilizer so the farmer can grow crops of improved quality and quanity. This will in turn create a greater demand for our products. Minor element use seems to be one of the keys to this objective even though we do not know much about the need and use of these elements. There is a growing conception which indicates that minor elements act as catalysts in plant metabolism. They aid the plant in making compounds of carbon, hydrogen, oxygen and nitrogen into organic compounds by acting as carriers of energy. It is well known that a definite or specific amount of energy is required to combine elements into compounds. A specific example could be the combination of hydrogen and oxygen to form water. In plant synthesis this combining energy is thought to come from the sun. It is believed that this solar energy is temporarily absorbed by the ions of this large number of different inorganic elements found within the plant. This absorbed energy is later released by these ions and utilized in the formation of the many thousands of organic compounds within the plant. As each of these numerous organic compounds, as well as the many steps in their formation, have their specific energy requirement, it is easy to see that there would be required a large number of these energy carriers. Since each element has its own specific energy quantum, an individual iron could then be essential for the carrying out of a special reaction in the formation of an organic compound. Without this

specific energy quantum there could be either too much or too little energy to produce the desired combination within the plant. It would be natural then to expect a need for a large number of energy carriers or minor elements. This falls in line with the known difference in nutrient needs of our plants and offers a suggestion as to the variation in the kind and amount of elements needed by plants. Our recent interest and increased knowledge of the structure of the atom has aided greatly in bringing out this conception of plant synthesis and varying nutrient requirements.

Our information on plant synthesis has also shown us that there are definite steps in these syntheses procedures. Many of these steps depend on the presence of a single element. Such information has helped us to verify the essentiality of many of the elements. This list of essential elements has continued to increase ever since man started his study of plant nutrients. There are many elements which have regularly been found in plants but which are not now considered essential. Many workers reported stimulation from the use of most of these supposedly non-essential elements. As our nutrition knowledge advances, it is only natural to assume that many of these non-essential minor elements will be moved over into the essential list. The following list of elements are the present doubtful elements which industry may have to be concerned with sometime in the near future:

Antimony, arsenic, barium, bismuth, bromine, cadmium, cesium, chromium, fluorine, iodine, lead, lithium, nickel, ribidium, selentium, silver, tellirium, titanium, tungsten, vanadium, gallium, germanium, indium, thallium, rare earths. The structure of many of these elements and the specific energy charge which they carry, indicates they could be carriers of the specific energy quantum needed to bring about the synthesis of a special part of a plant compound. This catalytic conception also explains why one element cannot substitute for another in plant growth. Secondary and minor elements are now recognized to be just as necessary as major elements for the growing of crops.

In the early days, the low analysis of the fertilizer mixtures permitted the use of plant food carriers which contained many minor elements as impurities. As the concentration of our fertilizers increases there are less of these minor elements contained in the fertilizer carriers and mixtures. Associated with this smaller incidental carrier of minor elements are greater removal of crops and a decrease in available supply from the soil organic matter and minerals. In order to off-set this depleting condition of minor elements, the fertilizer industry has tried many ways of supplying these needed nutrients. One of the first methods was to apply water soluble chemical salts of the outstanding deficient elements. Such materials are readily available and quickly assimilated by plants. However, all elements which are essential for plant growth are detrimental or toxic to plants in quantities beyond the actual need. An application of enough of a soluble minor element carrier for the seasonal need of the crop could be and often is toxic to the young plant. As a result, there is a tendancy to apply only small amounts of these soluble minor element carriers. Such a practice often does not supply enough of the needed element for adequate growth. This may create the belief that the need of the element is small when it is really large.

Another method of applying minor elements has been in the use of crude ores, minerals, etc. Such carriers are usually finely ground before their application. Typical examples are the use of feldspar, green sands, shales, etc. These ores or minerals are acted upon by the biological and chemical forces in the soil to make them available to the plant. Sometimes such carriers are not sufficiently ground and therefore are not soluble enough to supply the growing need of the plant. Some producers of minor elements have come a step further in the method of supplying minor elements by concentrating the ore fraction carrying the specific element. This beneficiating process consists in removing the undesirable materials, such as silicates, and grinding the product to a specific size. Finely ground phosphate rock is a good example of this practice. The specific element comes into solution slowly from such a material as it is used by the growing plant. Such carriers seldom supply enough of the soluble element to the soil at any one time to produce toxicity to a plant. Often times, such a method of supplying a minor element maintains a better supply of the element and produces a better growth than an application of a water soluble carrier.

Some element deficiencies have been corrected by applying small amounts of spray materials. These carriers are absorbed directly through the leaves of the plant. This procedure could rapidly correct some critical nutrient deficiencies in the plant. However, if the need is great, it is nearly impossible to supply a sufficient quantity of the needed element without "burning" of the foliage. Such foliage injury can be prevented by using a low concentration of the element and spraying several times. Such a procedure does not correct the nutritional needs of the soil micro-organisms which are usually as great as the growing crop. Without sufficient minor elements, our soil micro-organisms cannot help us control undesirable disease, insects, etc. Spraying is also a rather expensive way of applying minor elements.

Another method recently used to correct minor elements needs of the growing crop has been to apply the specific elements in question to the soil with chelating agents. In this method the needed element is combined with organic compounds which prevent the element from reacting with other compounds in the soil to reduce its solubility. Usually an element added with a specific chelating agent is applied in relative small amounts. This method is often far more immediately effective than even water soluble carriers of the element. The chief drawback to the use of chelating

agents have been their cost. There may be quite a future to this method of applying minor elements for special conditions.

The demand for minor elements has grown rapidly in the past few years. In some sections of the country these minor elements are as important as the major elements. Fertilizer producers everywhere are being requested to add minor elements to their mixtures. Sometimes these are specific formulas requested and sometimes they are just general demands without much detail as to the mixture or quantity. Fertilizer companies have tried and still are trying to meet their demands. In all probability they are not as successful in this duty as they would like to be. Although this fact has not been recognized by the producers of minor element materials and mixtures, most fertilizer producers believe the logical place and way to apply such carriers is with the fertilizer. The minor element problems of the fertilizer producer are far from answered. After one hundred years of fertilizer use there are still problems with the major plant foods for the industry, so there will probably always be minor element problems. It is believed that our industry will always be striving to meet the nutrient need of our soils and crops regardless of the kind of plant food requirement.

Dutch

(Continued from page 34)

especially, have been much improved, since the quick dispatch of incoming and outgoing ships is an essential factor for bulk-goods producing industries. The two new cranes at the Pernis wharf are among the largest of their type in Europe.

Remodeling of the internal transportation system meant also the construction of entirely new type storage sheds. Also installations were constructed to meet the demands of truck-loading and paper-bag-packing so as to meet special requirments both from home and overseas customers.

During the year 1951-52 the demand for concentrated manures continued to rise and it was possible, in spite of world-wide shortages of raw materials, to keep the sulphate of ammonia factories working at full capacity. The production of superphosphates decreased in the second half of the year due to a fall in the demand. The production of triple-super and concentrated compounds, on the other hand, increased.

During the first half of the year 1952-53, the high level of prices have caused some fall in production, though prices fell considerably in the summer, and it is expected that the spring demand will bring activity to full capacity again.

Ruhm Phosphate Moves Offices

Ruhm Phosphate & Chemical Co., operators at Columbia, Tennessee of a raw ground rock phosphate plant, have announced plans to move central offices from Chicago about June 1.

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MINNEAPOLIS, MINNESOTA
NEW YORK, NEW YORK

Multiwall Bag Division ALBEMARLE PAPER MANUFACTURING COMPANY, RICHMOND, VA.

ARKANSAS

California Spray Chemical of Shreveport will soon be in production with its $100,000 pesticide plant at Pine Bluff.

ARIZONA

Arizona Fertilizers, Inc., Toltec, are building a new plant for production of insecticides as well as fertilizers; incorporating a micro-pulverizer unit. **Pennsalt** technicians are supervising this installation. **Frank Marrick** is plant manager.

CALIFORNIA

San Jacinto Chemical Corp. stockholders have approved a merger with **Smith-Douglass** as the surviving corporation. The merger, approved also by S-D stockholders, does not involve any change in the nature of the securities they now hold.

* * *

Brea Chemicals, Brea are installing two nitrogen and two hydrogen purification generators, with a daily capacity of synthesis gas enough for 235 daily tons of ammonia, produced by **Air Products, Inc.,** Allentown, Pa.

FLORIDA

Webb's City feed and fertilizer store moving to a new location in St. Petersburg brings to mind the fact that this off-shoot of the most amazing drug store in the world is rated as the largest feed and fertilizer store in the nation. In addition to fertilizers, a full line of pesticides, implements etc. make up the volume. **Laurens B. Page** is department manager.

* * *

American Cyanamid's Arthur Crago, manager of the plant between Lakeland and Bartow, disturbed that his slime dikes might break and cause neighbor trouble, decided to test the actual effect of slime on grass. Flooding a field a foot deep he found that instead of killing the grass, it caused better growth—a 1 64th inch cake of dried slime remaining at the roots after evaporation seems to help on the fine sand tailings where the grass is growing. Mr. Crago says he doesn't know how it works, but intends to find out. Maybe there's a new by-product—and certainly, if it works, a big saving in disposal of slime. The cake analyses 14% phosphate, 4550 per million of calcium, 1500 of magnesium, 242 potash, 7 of copper, two of manganese—and some unavailable aluminum.

IDAHO

J. R. Simplot's new triple superphosphate plant at Pocatello went into production during April. Production manager **Larry Buhler** is pleased with the plant's performance. President **J. R. Simplot** lent a hand on the first run.

ILLINOIS

Shrock Fertilizer Service has bought a site for an anhydrous ammonia storage and distribution center at Minier.

* * *

Jasper County Farm Bureau is building a new fertilizer plant at Pleasant Ridge, where fertilizer will be tailored to soil requirements, as provided by a new state law.

KANSAS

Nitro Fertilizer & Equipment Co. has been organized with $40,000 capital at Salina. **G. M. McClellan** is resident agent.

LOUISIANA

Lion Oil board chairman, **T. H. Barton,** reporting to the recent stockholder meeting at El Dorado, Arkansas, stated that completion of the new plant near New Orleans would bring the company's investment in chemical manufacturing just about into balance with the oil phase of their operations. President **T. M. Martin** added that the program begun in 1952 represents the greatest construction program for manufacture in the company's history.

The $31,000,000 Barton Plant near New Orleans will go into operation in the second quarter of next year.

* * *

Louisiana Agricultural Supply, Baton Rouge, established in 1940 and now doing better than $3,000,000 annual business produces both fertilizer and pesticides. They have long invited the public to watch mixing of fertilizer, formulation of insecticides and cleaning of seeds—and attribute much growth to this confidence-building idea. **W. F. Williamson,** senior and junior are president and executive assistant respectively. The LSU tiger and purple and gold are their brand. Their slogans include "For the land's sake . . ." and "If our seeds do not come up, bring them back."

* * *

Liquid Nitrogen Company, Inc., Crowley, fertilizer and chemicals, has been granted charter of incorporation listing capital stock of $1,000.

MAINE

Northeastern Chemical Corp., Portland, formally opened their new plant late last month, producing pesticides during the season and other agricultural products during the off-season. **Joseph P. McKenna** is manager.

MICHIGAN

U. S. Steel is opening up a new limestone quarry and processing plant at Cedarville, which is expected to turn out three million annual tons.

MISSISSIPPI

Mississippi Chemical, Yazoo City, has a $900,000 RFC loan as part of its $4,750,000 financing of the new anhydrous ammonia, ammonium nitrate and nitric acid expansion, which **Girdler** is building for them. This brings their investment up to around $13,000,000. The original plant began production two years ago.

MISSOURI

Mathieson Chemical and **Mississippi River Fuel** are associated in the construction of a $21,000,000 fertilizer plant which has been certified for a 45% write-off in five years. This amplifies our story of last month, which reported one site

optioned. They have optioned three sites, all on the River in Jefferson County, and plan to barge phosphate from Florida to the finally chosen location. **William G. Marbury** president of the Fuel corporation, has stated that construction will likely have begun within 1953.

* * *

St. Louis Sulphur and Chemical Company suffered a stubborn sulphur fire April 14 which had the firemen crying, but caused only $200 damage to the plant. Blasts in the tower housing a conveyor belt ripped away sheet metal siding and shattered a window, but no one was hurt.

NEBRASKA

General Fertilizer Company, Fremont, has begun construction of their mixing plant which will have a capacity of 20,000 annual tons, beginning about July 1. Officers are: **W. A. Koepplin,** president; **Stewart Daniels,** vice-president; **Victor Keilstrup,** secretary-treasurer. **B. T. Christensen,** also Farm Service Director of the Farm Service Division of **Pfister Hybrid Company,** Fremont, will handle sales.

* * *

Allied Chemical & Dye, at last report, had not yet secured the needed twelve million daily cubic feet of natural gas on a guaranteed non-interruptible basis required for them to proceed with their 61,700 annual ton nitrogen plant at LaPlatte, near Omaha, a $25,000,000 project.

NEW YORK

Niagara Division of Food Machinery and Chemical, Middletown, has bought property at Wyoming, Ill., where a plant will be created to produce farm chemicals. Buildings included cover 32,000 square feet of floor space.

* * *

National Gypsum, Buffalo, will spend $18,000,000 in the next two years for improvements, according to President **Melvin H. Baker.**

NORTH CAROLINA

Dixie Guano Company, Inc., has under construction a fully-automatic 39,000-square-foot addition to its present plant at Laurinburg.

The addition, measuring 150 x 260 feet, will be a standardized steel-frame structure produced by the **Luria Engineering** at its fabricating plant in Bethlehem, Pa. As a result of the automatic facilities to be installed at the plant, only one man will be required during seasonal lulls to fill the entire bulk storage area with 12,000 tons of bulk mixed fertilizer. This will enable the concern to have a substantial inventory ready for processing and packaging when orders reach their peak during the Spring planting period.

The multi-span rigid steel framework, weighing 224 tons, with its corrugated asbestos-cement cover, has been designed and fabricated by Luria. **Southeastern Construction Company** of Charlotte, did the ground clearance, excavation and foundation work. The field erection of structural steel and application of cover are being handled by **E. W. Hurst Company** of Atlanta, Ga.

Plans call for completion of construction by June and for occupancy next October.

The new structure will be connected to the present plant, located on U. S. Highway 74, by a 150-foot long bridge that will span three railroad tracks. It is planned to have a system of conveyor belts carry the bulk mixed fertilizer from the existing plant over the connecting eight-foot-wide bridge into the main bulk storage area of the new building. This area will be 260 feet long and have a clear span of 80 feet, with 20-foot-wide work aisles on each side. The section will have a roof monitor, 10 feet wide and seven feet high, which will house shuttle conveyor belts for receiving and discharging the bulk mixed fertilizer coming over the bridge.

The second section of the structural addition, measuring 30 x 260 feet, will be used to house equipment to screen, mix, package and ship the fertilizer. It will be equipped with two automatic screening and mixing units supplied by the **Atlanta Utility Works** of Atlanta, Ga. One of the units will have a by-pass and conveyor system which will load bulk fertilizer in box cars or on spreader trucks.

To facilitate shipments, the new plant will have a 20-foot-side concrete loading platform running the entire length of the building and railroad siding to accommodate six cars. It is expected that 80% of the shipping volume will be by auto trucks.

Completely fireproofed, the plant superstructure will be laid on a heavy concrete foundation.

Matthews & Hollis of Laurinburg were the engineers on the project.

NEW MEXICO

Southeast Potash are about to put a million dollars into a second muriate storage warehouse at Carlsbad. It will be 550 x 150 feet, with a capacity of 100,000 tons. Their present warehouse holds 45,000 tons.

* * *

International Minerals and Chemical are building a warehouse the same size as Southeast's in the same area.

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OHIO

Nitrogen Division has announced a big housing development within walking distance of the building South Point plant. 105 three-bedroom residences are to be built by **Nelson Construction** of Huntington, W. Va., at a cost of around $11,000 each, house and lot. One a day is the building schedule. Approved for FHA and GI loans the down payments will be less than $1000. Variety of front will avoid duplication of design in any one block.

OKLAHOMA

Oklahoma Farmers Union, Yukon, has bought the plant of Dobry Flour Mills, and will convert it into a feed and fertilizer plant, within the next six months. Stock is being sold to local farmers.

OREGON

Columbia River Lime Company, Milwaukee is distributing lime through the Northwest via barge—from a distribution point at Megler, Washington, upriver as far as Albany and along the coast as far North as Grays Harbor, and as far South as Coos Bay. Owners are: **Sam Gregson** and **John Herb.**

TENNESSEE

Virginia - Carolina, whose Mt. Pleasant plant modification we reported here in January, and again last month, expects the whole program to be complete late next month. They include new superphosphate storage, a new acidulating plant, an up-to-date manipulating department to provide increased production, installation of new bagging machines, relocation of railroad tracks.

* * *

Tennessee Farmers Cooperative is spending $200,000 to expand its fertilizer plant at Lavergne.

Mid-South Chemical, Memphis, is building a 4000 square foot office building there. Mid-South distributes anhydrous ammonia over a wide mid-West area.

TEXAS

Henderson Oil Mill & Fertilizer Company, Henderson, have been kept busy fumigating cotton seed against the pink boll worm. About 300 cotton producers delivered some 2300 sacks of seed for treatment, under USDA direction.

* * *

Southwest Fertilizer and Chemical, El Paso, went into production early last month in their new $100,000 plant specializing in a 20% superphosphate as well as 10-10-0 and 14-7-0 grades of fertilizer. Located next to the Standard Oil refinery, sulfuric is piped directly to the Southwest plant. They are reported doing $3,000,000 annual business.

* * *

Phillips Chemical Company's triple superphosphate plant on the Houston ship channel is now being built, by **Rust Engineering.** The plant will have a capacity of 405 daily tons of granulated, and will be integrated with the existing Phillips ammonium sulfate operations there. The contract includes added dock, three 5,000-ton silos for phosphate rock storage, new bagging equipment and complete new phosphoric acid and triple superphosphate facilities. The ammonium sulphate plant will also be expanded. Completion is scheduled for this Fall.

WASHINGTON

Simplot Soilbuilders are opening a new unit at Walla Walla which will specialize in dry and liquid fertilizers, managed by **Wells Labberton** (see Personals).

VIRGINIA

Virginia-Carolina has won a $3,600,000 Army Chemical Corps contract to produce white phosphorus.

INDIA

Pakistan Industrial Development Corporation's plant at Daudkhel to produce 50,000 annual tons of ammonium sulphate, was reported here last month. $7,000,000 of the cost is being underwritten by the US Technical Cooperation Administration. The plant is scheduled in production toward the end of 1955.

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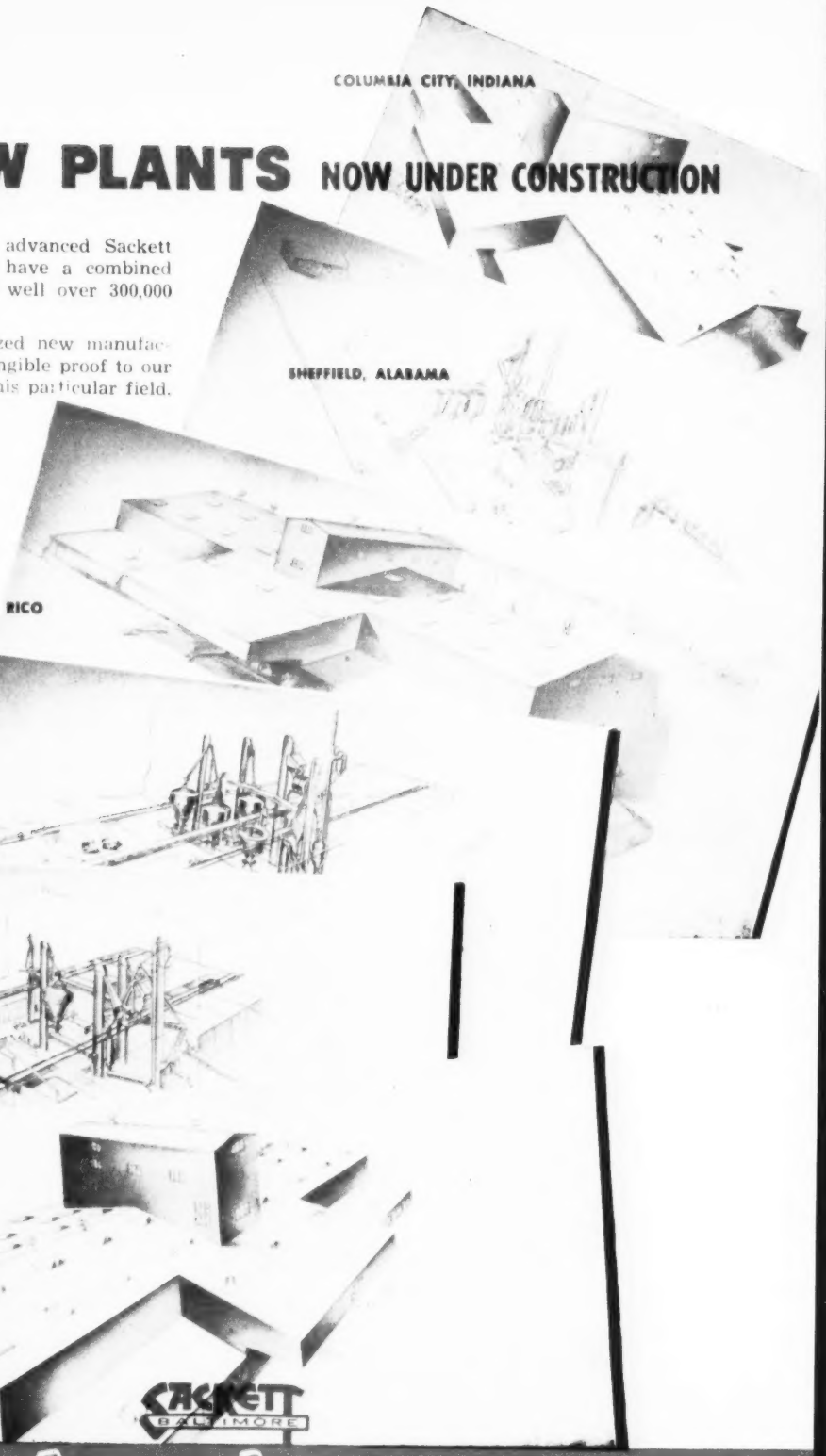

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NFA 28th ANNUAL CONVENTION

June 15-16-17, The Greenbriar, White Sulphur Springs, West Virginia

SUNDAY, JUNE 14

8:00 P.M.—Registration begins.

MONDAY, JUNE 15

8:00 A.M.—Breakfast Meeting—Committee on Publications (Greenbrier Suite)

9:00 A.M.—Registration.

9:00 A.M.—Meeting of the Board of Directors (Washington and Lee Rooms)

10:00 A.M.—Open Meeting of the Plant Food Research Committee (Auditorium)

All those attending the convention are cordially invited. Topic of discussion: "Efficient Water Utilization."

PARTICIPANTS

Chairman: H. H. Tucker, Director, Coke Oven Ammonia Research Bureau, Columbus, Ohio; W. B. Camp, W. B. Camp & Sons, Inc., Bakersfield, California; R. Q. Parks, Manager, Agricultural Service, Grace Chemical Company, Memphis, Tennessee; James E. Ferguson, Sprinkler Irrigation Association, Washington, D. C.

4:00 to 5:30 P.M.—Garden Party for Ladies (in the Old White Patio)

6:30 P.M.—Refreshment Hour—American Potash & Chemical Corporation (President's Room) H. J. Baker & Bro. (Ballroom)

9:00 P.M.—Nominating Committee Meeting (Washington Room)

9:00 P.M. to 10:30 P.M.—Reception—Southwest Potash Corporation (Virginia Room)

9:00 P.M. to 1:00 A.M.—NFA Cabaret Party (Auditorium)

TUESDAY, JUNE 16

8:00 A.M.—Breakfast Meeting—Plant Food Research Committee (Lee Room)

9:00 A.M.—Registration.

9:45 A.M.—GENERAL MEETING. Auditorium (Ladies invited) Chairman Louis Ware presiding.

Invocation: Rev. D. L. Beard, Minister, Presbyterian Church, White Sulphur Springs.

Annual Convention Address: Louis Ware, Chairman of the Board of Directors.

Address: "The New South," Hugh M. Comer, President, Avondale Mills, Sylacauga, Alabama.

Address: The Solid Future for Agriculture," Honorable True D. Morse, Under Secretary of Agriculture, Washington, D. C.

Report of Nominating Committee:

Submittal of the Budget:

2:00 P.M.—Ladies' Bridge Party (In the Trellis Lobby)

FESTIVAL NIGHT

6:00 P.M.—Refreshment Hour — International Minerals & Chemical Corporation (Ballroom)

7:30 P.M.—Annual Banquet — Louis Ware, Toastmaster (Added charge by the hotel for this function and gratuities—$4.85 per person)

Entertainment—Charles Vance, internationally famous star, offers enticing entertainment full of mystery, magic and merriment.

10:00 P.M. to 1:00 A.M.—Dancing in the Ballroom.

Wednesday, June 17

9:00 A.M.—Registration.

9:45 A.M.—GENERAL MEETING — Auditorium (Ladies invited) Chairman Louis Ware presiding.

Annual Convention Address: President Russell Coleman.

Panel Discussion: "Proper Use of More Fertilizer."

PARTICIPANTS

Moderator: Roy Battles, Assistant to the Master, The National Grange, Washington, D. C.

Milton C. Cummings, President, Farmers and Merchants State Bank, Effingham, Kansas, representing the credit agencies.

Werner L. Nelson, In Charge, Soil Fertility Research, School of Agriculture, North Carolina State College, Raleigh, representing the Land Grant Colleges.

Frank W. Parker, Director of Soils Research, BPISAE, U. S. Department of Agriculture, Beltsville, Maryland.

W. F. Price, Plant Food Division, Swift & Company, Chicago, Illinois, representing the fertilizer industry.

Unfinished Business.

New Business.

Memorial Record: Morris Newman.

12:30 P.M.—Adjournment.

The annual meeting of the new Board of Directors will be held immediately after adjournment for the purposes of organizing and transacting any business that may properly come before the Board.

Recreation

Monday, June 15

Members' Golf Tournament.
Ladies' Putting, Golfers—10:00 a.m
Ladies' Putting, Non-golfers—2:00 p.m.
Horseshoe Pitching—1:30 p.m.
Ladies' Garden Party—4:00 p.m.
Men's Tennis.
Ladies' Tennis.
Dancing in the Evening.

Tuesday, June 16

Members' Golf Tournament.
Veterans' Golf Tournament.
Guests' Golf Tournament.
Ladies' Golf Tournament (tee off 10:00 a.m.)
Horseshoe Pitching—1:30 p.m.
Men's Tennis.
Ladies' Tennis.
Ladies' Bridge Party—2:00 p.m.
Dancing in the Evening.

Wednesday, June 17

Members' Golf Tournament.
Men's Tennis.
Ladies' Tennis.

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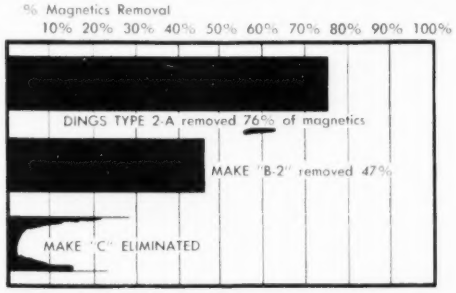

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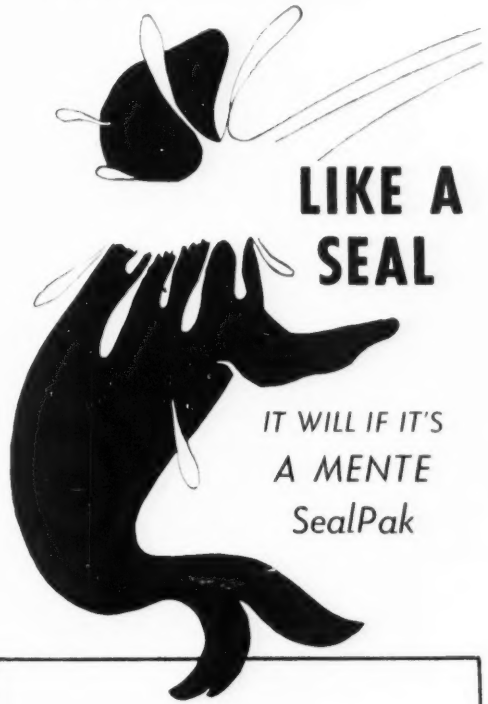

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Mostly Personal

Charles E. Brian has been made assistant sales manager of the **Florida Agricultural Supply Co., Wilson & Toomer** subsidiary, at Jacksonville, Florida. He has been district manager for another pesticide concern in Michigan.

* * *

Jack F. Criswell, since 1948 with **National Cotton Council's** production and marketing division, has become executive secretary of the **Agricultural Ammonia Institute,** Memphis.

* * *

John W. Hall has been made general sales manager and **G. A. Woods** his assistant by **Potash Company of America. P. C. Ausley,** who has shared this responsibility cannot continue due to illness, and will move to Florida, representing the company there. Mr. Woods will continue to serve his territory until a successor is named.

* * *

William B. Plumb has been made production manager of the Los Angeles plant of **Fulton Bag & Cotton Mills** and **William P. Gatts** will be sales manager there. Mr. Plumb has been with them since 1936; Mr. Gatts is a veteran of 19 years in the bag industry.

* * *

William B. McCloskey, since 1946 controller of **Davison Chemical,** is now a vice-president. He joined them in 1930 and was with NFA before that from 1927-1930. **Frank J. Griffin** becomes controller, with **Frank Z. Oles** as assistant, both have long been with the company.

T. R. (Jack) Cockerham has joined **Arkell & Smiths,** and will represent them in Florida, replacing **T. F. Sheridan,** transferred to the Mobile office. **E. K. Schultz** has become Michigan area representative.

* * *

Archie E. Albright, Jr. has been made assistant to executive vice-president **Hans Stauffer, Stauffer Chemical.** He was formerly with a New York law firm.

* * *

George E. Dean has been made sales manager of the Kansas City sales division of **Bemis Bro. Bag Company,** whom he joined in 1942.

* * *

H. F. Tomasek has been made sales manager of the **Pittsburg Agricultural Chemical Company,** a division of **Pittsburgh Coke & Chemical.** He joined them in 1948. **Alan S. Evans, Jr.,** with them since 1942, has replaced the late **F. D. Schreiber** as manager of the local coal chemicals division.

* * *

Dr. James C. Rinehart has become Development Agronomist, a newly created post at **United States Gypsum.**

* * *

Dr. James C. Engibous, Monsanto Chemical soil scientist, was guest speaker at the April meeting, Western New York Chapter, ACS.

C. R. "Bob" Asher, who has joined the agricultural sales division of Spencer Chemical, covering Illinois, and replacing Francis E. Best, transferred to Missouri.

Kenneth D. Lozier, 13 years with the company, who has been elected vice-president of St. Regis Paper at a board meeting which also made B. W. Recknagel assistant secretary.

Wells Labberton, who manages the new Simplot Soilbuilders unit at Walla Walla, Washington (See Map) He formerly operated his own spray business at Walla Walla.

William W. Kingman, who has been made general sales and advertising manager of Highway Equipment Company, Cedar Rapids, Iowa, according to President Roy C. Gaddis.

Willard R. Ashburn, senior partner of the law firm of Ashburn, Agelastro and Sellers, who has been made vice-president and general counsel of Smith-Douglass Co.

Dr. Robert Q. Parks, who has been in charge of soil management and fertilizer use research for USDA becomes manager of agricultural services, Grace Chemical Company, Memphis.

Frasch Sulfur Output Rises

Frasch sulfur producers turned out 5,293,145 long tons last year.

During the year stocks were built up from 2,837,432 tons to 3,068,855 tons—at the end of December. Sales in 1952 apparently totaled 5,061,722 tons, against an apparent total of 5,095,347 tons the year before.

Texas Gulf Sulphur reported 2,597,557 tons of production; Freeport Sulphur Co., 1,691,995; Jefferson Lake Sulphur, 405,383, and Duval Sulphur & Potash, 238,210.

In 1952 Texas Gulf Sulphur was expending production capacity at Moss Bluff Dome and in May, the company began mining at spindletop Dome, 6 in Texas.

Freeport Sulphur began production at the Bay St. Elaine Dome in Louisiana in November, and was working on the development of domes in Louisiana, and Texas.

Production of recovered sulphur at gas treatment plants increased from 184,013 long tons in 1951 to 248,076 tons in 1952. The increase resulted from the expansion programs of companies processing sour natural gas. A further increase in recovery of this type of sulfur is expected this year.

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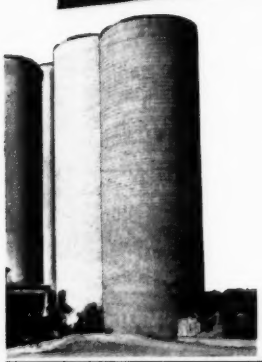

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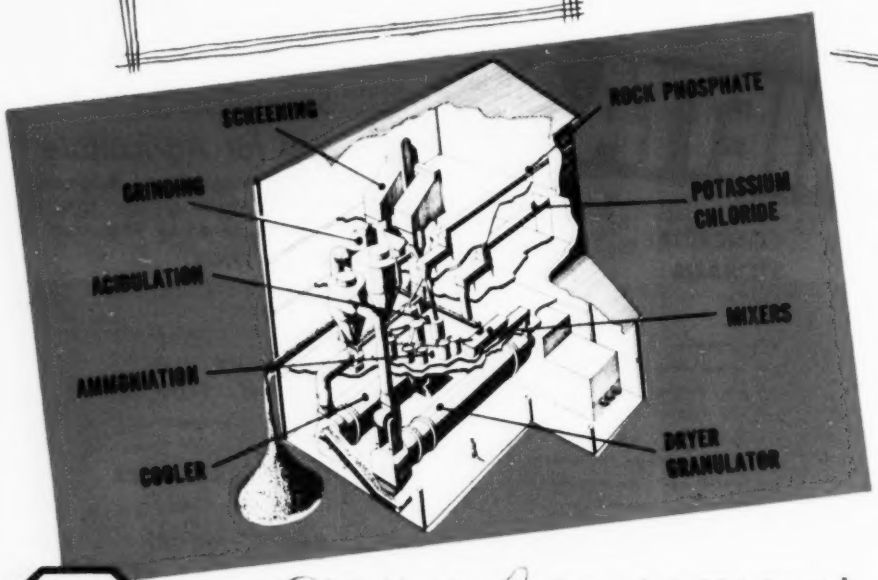

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11	11	11	" " "
10	15	20	(phospho-nitric acidulation)
12	15	18	" " "
12	12	20	" " "
14	14	14	" " "
10	20	20	" " "

10-10-10 fertilizer produced up to 132.4 bushels of corn in dry growing season

Farmers interested in big corn yields from run-down land can take a tip from Andrew Cross of Letart Falls, Ohio.

In 1952, he put an excellent 10-10-10 fertilizer program into effect on his newly-purchased farm. It included 600 pounds per acre of 10-10-10 plowed down, an additional 300 pounds at planting time and 50 pounds of nitrogen as side dressing. The result, in spite of rainfall four inches under normal, was yields up to 132.4 bushels per acre on relatively good land, and 89 to 111 bushels on land that had been left idle for 30 years as unprofitable.

This spring, Mr. Cross is applying 1000 pounds of 10-10-10 at plowing time and is looking forward to even better yields than in 1952.

Bigger yields for farmers mean better business for you

MR. CROSS embarked on his 10-10-10 program last year at the suggestion of a representative of a fertilizer manufacturer. His excellent results meant a good sale to him in 1953. You can build a profitable business in high-nitrogen fertilizers through just such an approach. It will pay off handsomely in years to come.

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For complete information on U·S·S Ammonium Sulphate, contact our nearest Coal Chemical sales office or write directly to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

U·S·S AMMONIUM SULPHATE

UNITED STATES STEEL

Davis

(Continued from page 22)

The story behind the drop in exports, which are expected to be about 1.5 million bales less this year than last, is one of increased supplies in foreign non-communist countries, some falling off of mill consumption in those countries, and lower prices for foreign cotton. In addition, dollar-exchange shortages and some reductions in foreign aid are involved.

The cotton industry should face the situation squarely. Keeping 1953 production within the 12 to 12.5 million bale maximum would almost surely avoid the need for restrictive controls on the 1954 crop. A larger crop would bring the danger of marketing quota controls—which nobody likes, even when the situation clearly calls for downward adjustments—and it would have a depressing effect on the market.

Past records show that cotton crops larger than needed to supply the current market, when reserves are already adequate, can bring farmers less net income than smaller crops have brought. Cotton once produced must eventually come to market, even though loan and storage programs may hold it back for a while. It is part of the total supply, and if not exported or used up in this country it inevitably tends to depress prices, or keep them depressed, until such time as the over-all supply is cut down through lowered production or increased consumption.

Maintaining adequate reserve stocks is important, but piling up supplies beyond this need simply does not make good business sense. Production and marketing controls are at best a not-too popular device for correcting an unbalanced supply and demand situation. It certainly will be better all around for cotton farmers to make their own needed production adjustments this year, in line with the indication of the most desirable levels.

Incidentally, I hope cotton farmers will not be under the impression that they must plant big acreages this year to protect possible acreage allotments for 1954. Under present legislation, the acreage of cotton planted in a State or county in 1953 would not affect the size of State or county allotments if they were established for 1954, nor would the 1953 farm cotton acreage affect 1954 farm allotments on most farms.

In commenting on the cotton situation, I am not expressing adverse criticism of past cotton programs and services. I know that the cotton price support loan programs have served as an important stabilizing influence, and fortunately without any net cost to the government. I know of the fine experimental and research work which has been carried on at State and regional laboratories and experiment stations. (And may I say that we need much more of this basic research—to cut labor requirements through better mechanization, to find ways of improving the usefulness of cotton fibers and adapting them to special needs, to develop more efficient marketing practices, and in other ways to help the cotton industry go forward progressively and on its own initiative.) I also know of the fine work which groups such as yours— and the entire cotton industry—are doing to advance the sound interests of cotton.

Before listing some of the things the Department of Agriculture has already done during the past few weeks to get started on helping solve basic cotton problems, I want to mention one factor which I am sure is of concern to you all. As you know, cotton faces pretty stern competition on a continuing basis. In a word, synthetics and foreign growths. Here is a place where research and education can play a very important part.

The present cotton situation of mounting supplies and softening prices, like comparable situations for other crops and livestock, was inherited by this administration when it took office just two months ago. The speed with which Secretary Benson has moved to initiate steps looking toward solutions of the immediate problems should be encouraging to the entire cotton industry.

An industry-wide cotton conference of 53 leaders, representing growers and all other segments of the industry, was held in Washington on February 12. This conference developed 13 specific recommendations to help solve the various problems which were apparent, and suggested the appointment of smaller committees to concentrate on special fields.

On February 13, a seven-man advisory committee on cotton exports began work on ideas to stimulate foreign markets for United States cotton, especially during the current marketing year. A committee proposal to facilitate exports through adequate insurance provisions when cotton is landed in foreign countries is now under active consideration.

On February 23, an advisory group on cottonseed started developing recommended steps to improve the cottonseed price support program and its operations. One of the specific problems with which this group is still confronted involves the excessive inventories of cottonseed oil, meal, and linters being built up under the program we inherited. Some of its recommendations are already under advisement.

On March 5, an eleven-man advisory group of producers, warehousemen, merchants and bankers met to consider recommendations to improve and strengthen the price support loan program for upland cotton. After two days of intense deliberation, this committee made a number of constructive recommendations all of which boil down to a return to the type of program we had in 1951 and former years. While no specific action has as yet been taken on these recommendations, I can assure you that they are in general accord with the thinking of the new administration. We want to see the price support programs operated as fully as possible—consistent with the objectives of these programs — through normal trade channels, direct operation by government agencies kept to a minimum. In addition to reducing government expenses, this will mean the least possible disturbance of the

normal movement of agricultural commodities.

All of these are practical, representative working groups. They are all continuing their work vigorously, and we are very optimistic that they will find sound solutions and help guide their execution.

The minimum support level for the 1953 crop of upland cotton was also announced on February 26, based on 90 percent of the then current parity price. It is 30.80 cents per pound, basis Middling $^{7}/_{8}$ inch, gross weight. If parity should be higher next summer at the beginning of the marketing season, the support level will be adjusted upward.

Backing up the work of the industry advisory group, the Department itself will aggressively seek increased exports and the most effective possible administration of stabilization and service programs.

The appointment of the cotton committees, and the many representing other segments of agriculture, is in line with Secretary Benson's declared intention to develop farm programs from the grass roots, basing decisions on the advice of those who produce and process and market agricultural commodities.

We are fully aware that there is a tremendous task ahead of us and that the stakes are very high. At the same time, we are confident that the job can be done with the advice and help of farmers, industry representatives, the Congress, and all others who have at heart the long-range welfare of agriculture. We want your help, we need it, and we hope we will have it freely and cooperatively—on the basis of the national interest.

Building on the experience of the past, especially of the last 15 or 20 years when the so-called "action" programs have been brought to bear so directly upon agriculture, we want to go forward constructively. Without giving up any securities, we want to build better and more permanent foundations for agricultural stability.

The Department of Agriculture—including the Commodity Credit Corporation with which I am directly concerned—is a service agency. We see our job as one of assistance and coordination, with primary responsibility and initiative resting with the farm and industry groups we serve. This is the traditional American way, with the government serving the people and not the other way around.

With these convictions, we are prepared to do our part in helping "keep agriculture prosperous"—not only now, but also for the long-range pull ahead. Let us plan for security for the farmer at least equal to that he now has, but let us also plan for progress in agriculture so that farmers can have the basis for an over-improving standard of living. We must keep agriculture prosperous.

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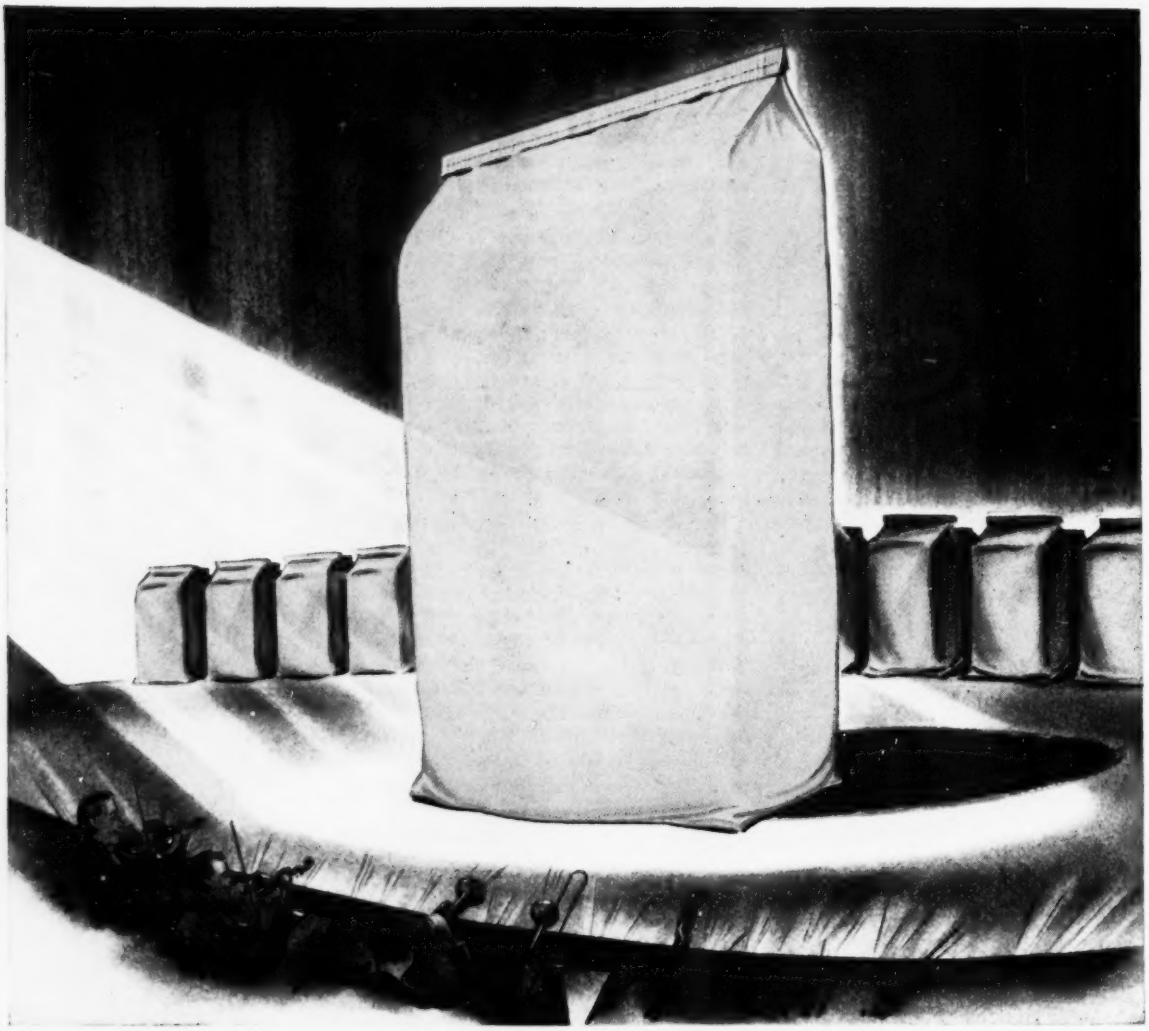

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Safety

N. C. STATE SAFETY MEET

Fertilizer Section—Room 35 Education Bldg., 1st Presbyterian Church

CHAIRMAN: C. J. Watts, Jr., Ass't Manager, Naco Fertilizer Co., Wilmington, N. C.

THURSDAY AFTERNOON, MAY 14 2:00 P.M.

REGISTRATION:

DOLLARS & SENSE OF SAFETY: Bill Creel, Safety Director, N. C. Department of Labor, Raleigh, N. C.

HOW TO ORGANIZE SAFETY: C. T. Wright, Safety Engineer, American Mutual Liability Ins. Co., Raleigh, N. C.

RECESS:

WHAT IS LOST TIME ACCIDENT: E. B. Manning, Supervising Engineer, Liberty Mutual Life Ins. Co., Charlotte, N. C.

FRIDAY MORNING, MAY 15 10:00 A.M.

STORAGE & USE OF EXPLOSIVES: E. J. Meyers, Ass't. Manager, Employee Relations Department, Safety & Fire Protection Division, E. I. du Pont de Nemours & Company, Wilmington, Delaware.

"THE ABC OF HAND TOOLS": Walt Disney Color Film, Courtesy General Motors Corporation.

FIRE! FIRE! FIRE! C. W. Wyrick, Chief, Greensboro Fire Department Greensboro, N. C.

NATIONAL FERTILIZER SAFETY MEETING CHICAGO OCT. 21-22

WEDNESDAY—OCTOBER 21, 1953

2:00 Report of John E. Smith, General Chairman, Fertilizer Section.

2:20 Election of 1953-1954 Officers.

2:30 Safety—"A Way of Life"—Dr. S. L. Rankin, Medical Director, Petroleum Chemical Division, Employee Relations Department, E. I. Du Pont De Nemours and Company, Inc., Wilmington, Delaware.

3:00 Case Histories—(6 Safety Directors, Factory Superintendents, or Production Superintendents will each give the details of one outstanding industrial accident which has occurred in their plant within the last year or two. They will describe the cause of the accident, tell of the investigation conducted, and then what steps have been taken to prevene recurrence of a similar accident. The individual speaker should not take over five minutes to relate the pertient details. Five minutes after each Case History will be allowed for questions and comments from the floor.)

4:30 Announcement of Cardox Demonstration and sale of tickets by C. A. Cox, Assistant Manager, Manufacturing Department, Virginia-Carolina Chemical Corporation, Richmond, Virginia.

4:45 General Discussion.

5:00 Adjournment.

NOTE: There will be a CO. Blasting Demonstration by the Cardox Corporation in the International Minerals and Chemical Company Plant in Chicago Heights at 9:00 A.M., Thursday. Chartered buses will leave from in front of the Hamilton Hotel at 8:00 A.M.

THURSDAY, — OCTOBER 22, 1953

P.M.

2:00 1954 Goals of Fertilizer Section—General Chairman Elect.

2:15 Blue Print for Survival—Dr. Neal Bowman, Representative, National Association of Manufacturers, New York.

3:00 State Safety Departments—"Friend or Foe"—Forrest H. Shuford, Commissioner of Labor, State of North Carolina, Raleigh, North Carolina.

Stewart L. Rankin, M.D. A Du Pont medical director, who will be one of the general speakers on the Fertilizer Section program at the National Safety Congress.

3:30 The Cost and Profit of a Successful Safety Program—Ralph J. Crosby, Assistant Vice President in charge of Accident Prevention, Marsh & McLennan, New York, New York.

4:00 General Question & Answer Period—Questions regarding Accident Prevention will be asked from the floor. This is not to be a panel discussion. There will be no speeches and no experts to ask questions. All questions should be pertinent to the interest of our group and will be answered by members of our own group who have themselves had actual practical experience dealing with the specific question asked.

5:00 Adjournment.

Lion Oil has been presented two Awards of Honor by the National Safety Council for the accident-prevention record established by the employees of the company in the year 1952. The Award of Honor is the highest industrial recognition for safety achievement awarded by the National Safety Council.

The company as a whole, which has more than 2600 employees, was presented an award for "a remarkable reduction in the frequency and severity of accidents." The employees of the company's manufacturing division, consisting of the El Dorado (Ark.) refinery and El Dorado chemical plant, won the other award "for working in excess of three million man hours without a disabling injury."

The presentation of the awards was made by Ned H. Dearborn,

(Continued on page 72)

SMALL PLANT SAFETY — BY N. C. LABOR DEPT.

The purpose of this manual is to explain briefly how to organize and operate a safety committee in a small plant. The safety committee has been found not only helpful but in most plants necessary in putting over an accident program as described in this manual. The "on-the-job" experience of the committee members is valuable in determining hazardous conditions and methods of work, suggesting corrective measures and obtaining plantwide participation.

WHY A SAFETY COMMITTEE?

In most cases small plants have little, if any, formal safety programs and the value of a safety committee is not known. Management and supervisors are left on their own to sandwich safety in with other activities. A safety committee leaves the responsibility for safety on the supervisor but does help him in his efforts to prevent accidents. By their observations, thinking, and discussions the committee provides the stimulation and suggestions necessary to maintain safe conditions and safe workers.

WHAT IS A SAFETY COMMITTEE?

A safety committee is a group of employees appointed to aid and advise management on matters of worker safety. The committee may be composed of top management and two or three foremen, or a foreman and several workers, or any other combination of supervisors and workers. It is important that top management be presented and participate in the organization and conduct of the committee meetings.

The chairman may be a supervisor or a worker guided by a member of supervision. He should be chosen for qualities of leadership, interest in safety, and ability to get results.

Safety committees usually hold regular meetings (weekly or monthly) at which the recommendations, accidents, records, and program plans are discussed; AND a monthly inspection of the plant with special attention being paid to the subject or aim chosen for that month.

SCOPE OF COMMITTEE ACTIVITIES

While the scope of the safety committee's activities, in most cases, is chiefly advisory, management may find it practical to appoint a plant engineer, supervisor or master mechanic to the committee with authority to correct unsafe conditions without further approval.

Through its activities and reports the safety committee keeps management informed as to the conditions of the plant and the progress or requirements for increased safety.

The success of the safety committee depends to a great extent upon the means provided for complying with or rejecting recommendations, and the subsequent follow-up. A step-by-step procedure for handling recommendations may follow a pattern such as:

1. Recommendation submitted to committee workers or committee members.
2. Discussion and acceptance, modification, or rejection by committee.
3. Accepted recommendation submitted to top management.
4. Written reply to committee from management.
5. Result reported to originator of recommendation.
6. Final report to committee on completion of recommendation.

WHAT THE SAFETY COMMITTEE DOES

The successful safety committee has something to do—actual planning of the safety program and a part in making the program operate. These activities will be determined by the size of the committee and the policies set out by the company and the group. It has been found advisable to establish definite policies when the committee is organized. These may include some or all of the following:

1. Establish procedures for handling suggestions and recommendations of the committee.
2. Conduct regularly scheduled meetings for the purpose of discussing accident prevention methods, safety promotion, items noted on plant inspections, injury records, and other pertinent subjects.
3. Inspect the plant for the purpose of discovering accident sources and hazards.
4. Investigate accidents for the recommendation of means of preventing recurrence.

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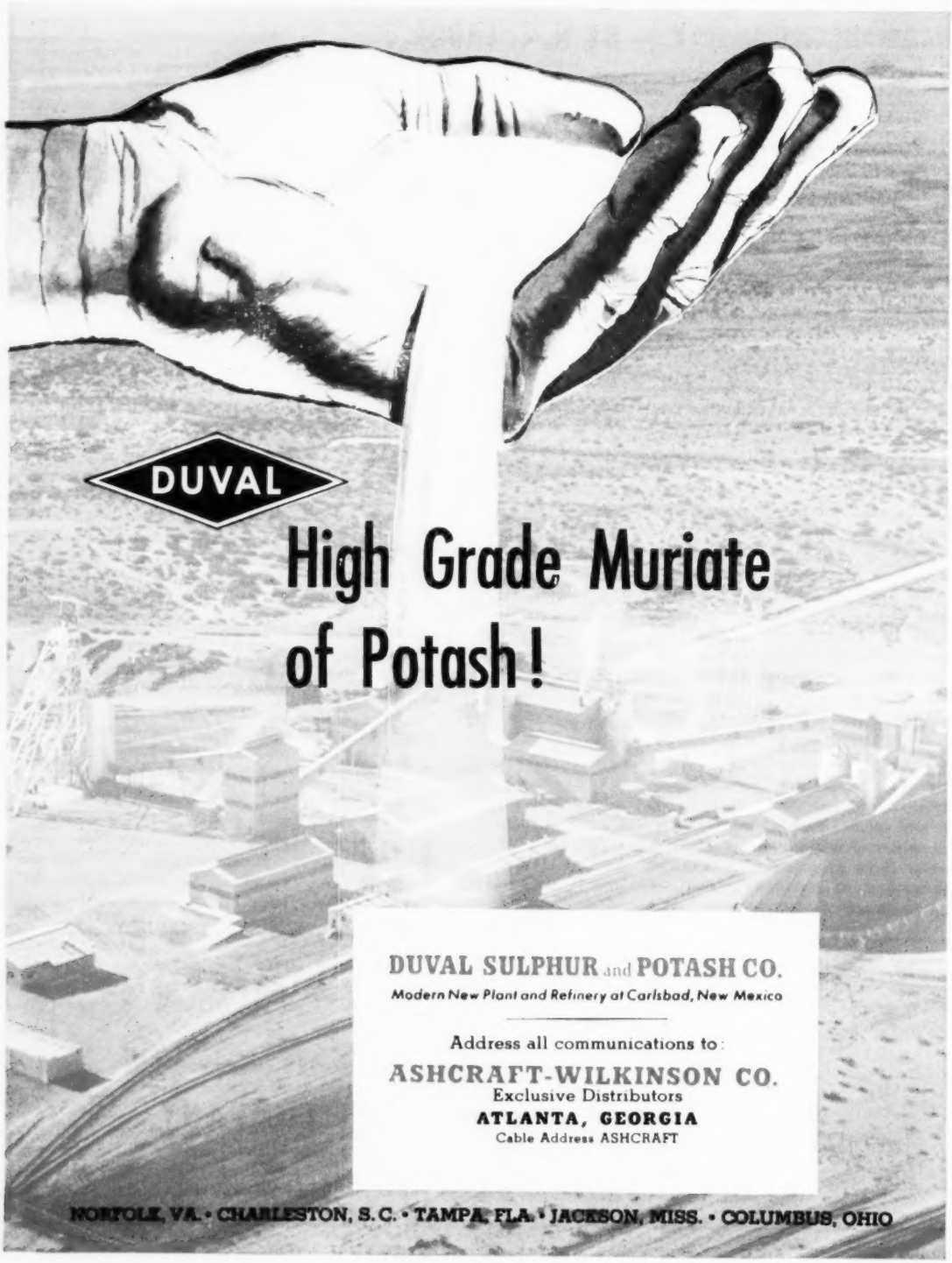
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5. Contact foreman in regard to safe working methods and practices.

6. Recommend changes or additions to protective equipment or devices for the elimination of hazards.

7. Develop or revise safe practices and rules to comply with current plant needs.

8. Promote safety and first aid training for committee members and workers.

9. Participate in advertising and in selling safety to the workers.

HOW TO MEASURE RESULTS

It is not possible to determine how many eyes, fingers, legs, or lives you save through your safety work, as there are so many variables involved. However, a standard measuring stick has been developed which is being used throughout the country.

This measure is called "Frequency Rate" and is a determination of the NUMBER OF DISABLING INJURIES PER MILLION MAN-HOURS WORKED.

The fomula is written:

Frequency Rate =
Number of disabling injuries x 1,000,000. Total number of employee-hours worked.

A DISABLING INJURY is defined as one which results in some permanent bodily impairment (death —loss of a finger—loss of sight) or prevents a worker from resuming work at the beginning of the next day or shift (lost time).

The total number of employee-hours worked may be obtained directly from the payroll figures or determined by multiplying the number of employees by the average number of hours worked in the given period.

USING THE FORMULA

Assuming that a plant of 500 employees worked 27 days at 8 hours per day—27 x 8 = 216 500 x 216 = 108,000 hours worked.

If there were five disabling injuries in this month,

$$F.\ R. = \frac{5 \times 1{,}000{,}000}{108{,}000}$$

Frequency Rate — 46.3 for this month.

By figuring the Frequency Rate at regular periods (monthly, quarterly, annually) the safety committee can judge its progress or effectiveness. If the frequency rate is above five, there is definite need for improvement.

PLAN SOME SAFETY FEATURE FOR EACH MONTH

One aid to a successful safety program is an objective for each month. By spot-lighting this objective throughout the plant and directing the efforts in inspections, posters, and discussion in this direction, the committee can expect results on the subject featured. Special industry safety programs, current accident sources as indicated by the plant accident reports, or other plant activities may suggest subjects to be featured.

The following example suggests the types of subjects which may be featured:

January—Housekeeping.

February—Floors, aisles, etc.

March—Machine hazards.

April—Goggles.

May—Stairs, ramps.

June—Electrical equipment.

July—Heat exhaustion.

August—Handling materials.

September — Handling acids, chemicals.

October—Hand tools.

November—Safety shoes.

December—Safe work methods.

SPECIAL ITEMS

Occasionally a special topic is to be featured or it is felt that some inspiration and interest is needed. The showing of safety films, an outside speaker on safety, a special demonstration of safety devices, equipment, etc. will help give the program a "shot in the arm!"

Awards for good records, for best housekeeping, or other incentives are excellent methods for getting cooperation.

USE A CHECK CHART FOR PLANT INSPECTIONS

Safety committee members may need some assistance in making plant inspections as they may not be familiar with the items they are expected to notice. To be most effective and helpful the chart should be made to fit the individual plant.

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NAC TO OBSERVE 20th ANNIVERSARY AT SPRING LAKE

The National Agricultural Chemicals Association will observe their 20th anniversary during their annual meeting at Spring Lake, New Jersey, September 9, 10, and 11, according to Lea S. Hitchner, executive secretary of the Association. Headquarters will be at the Essex and Sussex.

"Plans now are that accommodations for the members will be made at both the Essex and Sussex, and the Monmouth Hotel," Hitchner stated, "because our membership has grown to the point where the Essex and Sussex can no longer accommodate all of the representatives." Hitchner reported that over 500 persons attended the annual meeting last year and an even larger number are expected for this 20th anniversary meeting.

As a special feature of the program a panel of seven ex-presidents of the Association will be asked to discuss the industry's status and to compare the present-day marketing activities, production and technical problems of the industry with those of former years.

The arrangement committee of the Association has announced preliminary plans for observance of the 20th anniversary and for the program of the 3-day meeting. The tentative program calls for a formal session on the morning of each of the 3 days with reports by the Association officers. Members of the Association will have the opportunity to hear addresses by officials of government agencies and by members of the industry. During one session members will have an opportunity to discuss various technical problems including the formulation of pesticidal chemicals, effects of pesticides on soils, legislative trends, exports, and other interests.

COTTON COUNCIL PUBLISHES CONTROL RECOMMENDATIONS

A summary of official state cotton insect control recommendations for each of 14 states has just been published by the National Cotton Council.

The booklet contains tables listing major cotton insects common to each particular state, insecticides and amounts recommended for control. It lists recommended controls with dusts and also with sprays, giving the number of pounds of dust mixture required and the pounds of technical material per acre for sprays. The tables also contain official recommendations suggesting when applications should be started.

Recommendations are listed for Alabama, Arizona, Arkansas, California, Georgia, Louisiana, Mississippi, Missouri, New Mexico, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas.

The Cotton Council publication sets forth general guides for the use of insecticides, as well as specific points to be remembered in applying dusts or sprays. Precautions for handlers and users of insecticides are summarized.

Eighteen insecticides are described briefly. These are aldrin, Aramite, benzene hexachloride, calcium arsenate, chlordane, DDT, dieldrin, endrin, EPN, heptachlor, methyl parathion, nicotine, Ovatran, parathion, sulfur, Systox, TEPP, and toxaphene.

MATHIESON BUYS JOHN POWELL CO.

Mathieson Chemical Corporation has completed negotiations which will lead to the acquisition of John Powell & Co., Inc., its subsidiaries and associated companies, according to a joint announcement made today (May 1) by Thomas S. Nichols, president of Mathieson, and H. Alvin Smith, president and treasurer of Powell.

John Powell & Co., Inc., founded in 1923, has been a leader in the development and formulation of insecticides, herbicides and rodenticides. Four basic grinding and mixing plants to serve pesticide formulators are operated at Brooklyn, New York; Atlanta, Georgia; East Omaha, Nebraska; and Elkton, Maryland. Sales offices are located throughout the United States and a technical service laboratory is maintained at Port Jefferson, Long Island, New York, to render assistance and formulating data to Powell's customers.

Mathieson has for the past several years been manufacturing basic chemicals for insecticide and herbicide use. The integration of Powell's board distribution system into Mathieson's agricultural chemicals business will make it possible to further expand Mathieson's operations throughout the United States and foreign countries.

The management of Powell will continue as a part of the Mathieson organization, and the present policy of service and assistance to Powell's customers will be continued and strengthened by this merger.

MARKETS

Easily overhauling last year's record first quarter sales by 188,000 tons, fertilizer tax tag sales and reports of shipments for the first 90 days of this year are equivalent to 2,796,000 short tons. In the like period of 1952 according to reports received by The National Fertilizer Association, shipment reports and tax tag sales were equivalent to 2,608,000 tons. This upswing in tag sales has widened the gap in fiscal year sales to date, from 5,337,000 tons during July-February, 1951-52, to 5,429,000 tons during the same 8 months in the current fiscal year.

ORGANICS: Interest in Organics for fertilizer use is primarily for the new season at this time and Nitrogenous Tankage is offered for summer months shipment at $4.50 to $5.00 per unit of Ammonia, bulk, f.o.b. shipping point. Imported Nitrogenous Tankage is indicated around $5.50 to $6.00 per unit Ammonia, in bags, CIF Atlantic ports.

CASTOR POMACE: Supplies are currently being offered from Domestic sources at $37.25 per ton in burlap bags paper bags, seller's option f.o.b. Northeastern production points with $2.00 per ton allowance if shipment is made in paper bags. Imported material, depending on quality, is indicated at around $36.50 to $40.00 per ton exvessel Atlantic ports.

DRIED BLOOD: Unground Dried Blood, in bulk, is currently at the lowest levels in recent years. Chicago market is around $4.50 to $4.75 per unit of Ammonia, bulk, and the New York market at around the same level.

POTASH: Domestic producers made heavy shipments during March and April demand is expected to be quite heavy also. Limited stocks of Imported muriate are available at South Atlantic Ports at prices considerably less than the delivered cost of Domestic material at these ports.

GROUND COTTON BUR ASH: This source of Potash, primarily in the form of Carbonate of Potash, continues available for prompt and future shipment at prices approximating the cost of Domestic Sulphate of Potash delivered destinations.

PHOSPHATE ROCK: Export orders have tightened supply situation on high-grade rock but low grade rock is in good supply. Prices remain firm.

SUPERPHOSPHATE: With the increased cost of Sulphur by some producers, price structure of Superphosphate is firm and some Superphosphate producers have advanced their prices while others remain unchanged. Demand for Triple Superphosphate exceeds supply.

SULPHATE OF AMMONIA: Coke-oven production is in strong demand and some producers are sold out. Comfortable stocks at various Atlantic ports prevent any shortage along the coast. The heaviest demand is from mid-west areas.

AMMONIUM NITRATE: Prices are firm and unchanged with demand far in excess of supply.

NITRATE OF SODA: Imported material and Domestic production are currently adequate to take care of demand. Some reclaimed Chilean Nitrate of Soda resulting from the fire at Wilmington in March is being sold rapidly at bargain prices, both in bags and bulk.

CALCIUM AMMONIA NITRATE: Demand for this form of Nitrogen testing 20.5% continues strong and large quantities are being distributed throughout the Southeast and Midwest.

GENERAL: Demand for mixed goods in the Southeast is tapering off but increasing in Northern and Western states. Movement of raw material such as Potash and Superphosphate, therefore, is reaching peak volume. No serious shortages except in 33% Ammonium Nitrate and possibly Sulphate of Potash are noted.

FERTILIZER TAX TAG SALES AND REPORTED SHIPMENTS
(In Thousands of Equivalent Short Tons)
Compiled by The National Fertilizer Association

STATE	March		February		Jan.-Feb.		Jan.-Feb.-Mar.		July-Feb.	
	1953	1952	1953	1952	1953	1952	1953	1952	1952-1953	1951-1952
Virginia	—	—	—	—	—	—	—	—	—	—
N. Carolina	—	—	254	308	417	540	—	—	704	856
S. Carolina	267	250	192	164	313	293	581	543	542	552
Georgia	219	220	144	106	226	188	445	407	517	440
Florida	156	119	175	136	329	298	484	417	950	848
Alabama	—	—	146	158	224	265	—	—	463	493
Tennessee	80	76	33	43	51	64	130	140	191	271
Arkansas	53	50	28	30	45	48	98	99	117	112
Louisiana	68	71	26	40	50	69	117	140	144	137
Texas	110	111	63	71	102	129	212	239	306	350
Oklahoma	—	—	16	24	23	35	—	—	94	99
TOTAL SOUTH	953	897	1,077	1,080	1,780	1,929	2,067	1,985	4,028	4,158
Indiana	127	106	140	91	305	246	433	351	840	729
Missouri	132	113	107	93	164	159	296	272	561	450
TOTAL MIDWEST	259	219	247	184	469	405	729	623	1,401	1,179
TOTAL OTHER	—	—	—	—	—	—	—	—	—	—
California	—	—	—	—	—	—	—	—	—	—
GRAND TOTAL	1,212	1,116	1,324	1,264	2,249	2,334	2,796	2,608	5,429	5,337

Herbicide Plant In New England

Construction of the first completely technical process plant for herbicides and fungicides in New England is announced by Northeastern Chemical Corp. at Westbrook, Me.

Location of the unit in New England should cut about 48 hours off the running time between source of supply and farmers and fruitgrowers in the area, Henry J. Hinman, Northeastern president, said in making the announcement.

CAL-MAG OXIDES
CUT YOUR COSTS WITH

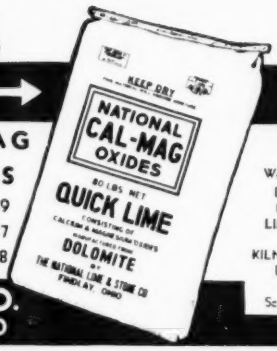
Unexcelled for its superior Dehydrating, Neutralizing, and Curing factors in the preparation of better fertilizers. Write for complete information.

PROMPT SHIPMENTS

Three railroads serve our Carey, Ohio plant--assuring prompt delivery--everywhere.

CAL-MAG OXIDES

MgO	40.39
CaO	58.07
TNP	203.88



We Also Produce
DOLOMITIC HYDRATED LIME (165 TNP)
and
KILN DRIED RAW DOLOMITE (107 TNP)
Screened to size

The NATIONAL LIME and STONE CO.
General Offices • • • • • FINDLAY, OHIO

V-C

(Continued from Page 19)

Twenty-one fertilizer plants completed the first half of our current fiscal year without a lost-time accident. The plants represented on this honor roll were: Memphis, Shreveport, Portsmouth, Birmingham, Nichols, Lynchburg, Mt. Pleasant, Baltimore, Greenville (S. C.), Charlotte, Selma, Durham, Dothan, Savannah, Montgomery, Wylam, Albany, Wadesboro, North Little Rock, New Bern, and Greenville (N. C.). Other plants in other divisions with perfect records were the Richmond bag plant, the Nichols chemicals plant, Phosmico in the Mining Division, and Waco of Tobacco By-Products.

As a result of this record our frequency rate in the Fertilizer Division took a nose-dive from 24.33 for the same period in 1951 to 15.57 for the six months ended December 31, 1952. Our company-wide frequency rate decreased from 22.09 to 14.60.

There's a new safety record in sight for V-C! And the lower the frequency rate, the more there is in it for YOU! Let's make it a goose egg!

Avco Corp. Buys Ezee Flow

The Avco Manufacturing Corporation April 18 announced it has acquired the properties and assets of Ezee Flow Corporation of Chicago and Collegeville, Pa.

Ezee Flow, manufacturers of fertilizer application equipment, will be placed under Avco's New Idea division, manufacturers of farm equipment.

E. A. Juzwick, president of Ezee Flow will be general manager of Ezee Flow division of Avco. Frank Juzwik will be assistant general manager and R. H. Shotwell will remain as sales manager.

Ezee Flow employs more than 100 people. A 15,000 square foot addition to its floor space already in construction will be completed by the end of May, it was announced.

OBITUARIES

Dr. Paul W. Chapman, 62, former dean Georgia College of Agriculture, president of the Southern Association of Science and Industry, author of many books, died April 28, unexpectedly, in Athens, Georgia.

C. Keys Sanders, 58, owner of Merco Fertilizer Company, Gaffney, S. C., died suddenly March 28 in Gaffney. He was one of the founders of the S. C. Plant Food Educational Society.

Walter W. Tyler, board chairman of Tyler Grain & Fertilizer Co., Wooster, Ohio, on April 6.

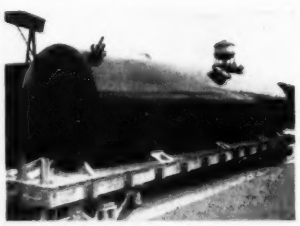
Scott Williams, 86, for 37 years a buyer for E. Rauh & Sons Fertilizer Co., Indianapolis, March 31 in a nursing home.

ALUMINUM TANK
9'-0" Diameter x 30'-0" Long
12,825 Gallons

"Cole" can furnish tanks made of **steel, aluminum** and **stainless steel** — built in accordance with ASME Code to meet all insurance requirements. Measuring tanks of Stainless Steel are carried in stock.

We invite your inquiries for Storage Tanks to handle Ammonia and Nitrogen Solutions. Anhydrous Ammonia—complete with fittings. Also Elevated Water Tanks, Acid or Oil Storage Tanks, Bins, Boilers, Stacks, etc.

R. D. COLE MFG. COMPANY
Newnan, Ga.



STEEL TANK
8'-6" Diameter x 38'-6" Long
16,500 Gallons

CLASSIFIED ADVERTISING

WANTED: Position as plant manager in south or southwest. Thirty-nine years old. Six Years experience in all phases of fertilizer business except credits and sales. Now employed. Good reason for desiring change. Excellent record and best references. Box #45, Commercial Fertilizer, 75 Third St., N. W., Atlanta, Ga.

EXECUTIVE WANTED: Age, 30-50; Salary, commensurate with qualifications and experience; Qualifications, must possess over-all operating experience in the fertilizer business, including production, office management, credit, and sales; Location, in a moderate-sized city in the deep South; Firm, an old established company with a reputation for service and good product; Reply, complete confidentiality assured. Give complete details regarding self in letter addressed to Box 44, c/o Commercial Fertilizer, 75 Third St. N. W., Atlanta,Ga.

STEEL TANKS FOR SALE: Dished heads—all welded. Excellent for storing liquid fertilizer, chemicals, etc. At Marion, Ind.—(12) 12,700 gal, (4) 11,000 gal, (6) 5,500 gal. At Norfolk. Va.—(13) 15,200 gal., (3) 5,800 gal. At Tonawanda, N. Y.—(5) 7,000 gal. At Mt. Carmel, Pa.—(9) 4,600 gal. (5) 4,300 gal. (2) 3,800 gal. Perry Equipment Corp., 1426 N. 6th St., Philadelphia 22, Pa.

FOR SALE: ROTARY DRYERS FOR GRANULATION. 2-7′ x 60′ Rotary Kilns. These make excellent heavy duty long life direct heat Rotary Dryers by installing lifting flights. Other Rotary Dryers in stock: 8′ x 54′, 6′ x 42′, 5′ x 40′, 4′6″ x 35′, 4′ x 30′ and 3′ x 50′. Send us your inquiries for Jaw, Gyratory and Roll Crushers, Ribbon and Drum Mixers, Pulverizers, Bucket Elevators, Hammer Mills, Vibrating Screens, Belt Conveyors. We buy your idle machinery. Our 36th year. CONSOLIDATED PRODUCTS COMPANY, INC., 14 PARK ROW, NEW YORK 38, N. Y.

WANTED: Plant managers job in state of Illinois or adjoining states, over 15 years experience in field of fertilizer, Box #43, Commercial Fertilizer, 75 Third St., N. W. Atlanta, Ga.

WANTED—Man, experienced in the fertilizer industry in sales and administration, to eventually take over management of location handling 20,000 to 30,000 tons of mixed fertilizers a year. Give full particulars of personnel history, experience and education in first letter to box #46, c o Commercial Fertilizer, 75 Third St., N. W., Atlanta, Ga.

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Speed up your plant with
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Capacities: 1 to 50 Tons per Hour
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Ammoniated Superphosphate

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Plants: Savannah, Ga., Atlanta, Ga.,
Charleston, S. C., Roebuck, S. C.

Lion Oil

(Continued from page 64)

president of the National Safety Council, to T. M. Martin, Lion president, on the company's network radio show "Sunday Down South." Dearborn in his remarks stated that Lion was "the only oil company in the United States to win the Award of Honor for 1952."

Martin in his acceptance gave entire credit to the employees and said that "our outstanding records were achieved by individuals working together." He pointed out that although the award to the manufacturing division was for exceeding three million man hours without a disabling injury, the employees of that division had, as of yesterday, worked a total of more than seven million, eight hundred thousand man hours without a lost-time accident.

Hyster Announces Two New Lift Trucks

Two completely new fork lift trucks in capacities of 3,000 and 4,000 pounds have just been released, according to a recent announcement of the Hyster Company.

They are the Models YC-40 and UC-30, powered by heavy-duty, water-cooled industrial engines and mounted on cushion-type tires. Outstanding features are said to be their extreme compactness, durability and maneuverability. The very latest in lift truck engineering, the YC-40 and UC-30 were "functionally" designed for appearance as well as efficiency.

Safety, serviceability, operator comfort and ease of operation are "built-in" the new trucks, it is claimed.

The trucks are now on display at Hyster dealers in principal cities of the world. Literature and specifications are available at any Hyster dealer or by writing Hyster Company, Portland 8, Oregon.

Kraft Bag Offers Brochure

Kraft Bag Corporation, Gilman Paper Company subsidiary, with modern integrated plants at Gilman, Vermont and St. Marys, Georgia, has just issued a brochure about their newest development in multiwall shipping sack construction known as "Kraft-lok" (trade-mark) . . . a valve-type gussetted bag for packaging free-flowing granular or pulverized materials that has been completely field-tested and time proven.

Requests for brochure should be directed to Dept. P, Kraft Bag Corporation, 630 Fifth Avenue, New York 20, N. Y.

Monsanto Wetting Agent Booklet

The 19 most frequently asked questions on the use of wetting agents in fertilizer to speed reaction and improve the ultimate texture, are answered in a booklet just published by Monsanto Chemical Company's Phosphate Division.

Copies of the booklet may be obtained from Phosphate Division, Monsanto Chemical Company, St. Louis 4, Missouri.

For your lead requirements!

CHEMICAL, ANTIMONIAL AND TELLURIUM

sheet lead and lead pipe

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NEW FRONTIER

Years ago when Horace Greeley was counselling young men to "go west", there were millions of rich acres to be claimed and farmed. Today, the new challenge to man's ambition is in the build-up of impoverished lands.

Potash Company of America, a prime producer of unexcelled red muriate potash, is proud of its position as a major contributor to the reclamation of these lands.

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Midwestern Sales Office . . . First National Bank Bldg., Peoria, Ill.
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UNION SPECIAL

Here's dependable, high speed bag closing . . .

Photo above shows a high production installation of a Union Special Class 20500 Bag Closing machine in a fertilizer plant.

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Use this new 16 page illustrated bulletin to quickly select the right machine for the job. Contains complete data on sewing heads, columns, conveyors, accessories, and over-all dimensions plus more than fifty illustrations of machines, plant installations and types of closures. Write for your copy now.

. . . to help you cut costs in *your* plant!

At today's high operating costs, you can't afford to have inefficient production methods in your plant. That's why it pays to take advantage of Union Special's faster, more dependable, more economical bag closing equipment. Union Special bag closers give you *more* production . . . per man . . . per hour because every Union Special is engineered and built with your basic requirements in mind — to do a specific bag closing job at lowest possible unit cost. For recommendations, see your local Union Special representative or write UNION SPECIAL MACHINE CO., 412 N. Franklin St., Chicago 10.

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